Constraints to a full adoption of renewable energy: An empirical assessment.

A thesis submitted in accordance with the requirements of the University of Liverpool for the degree of Doctor of Business Administration by

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DEDICATION

No person without family or friends can accomplish such a challenge as the DBA course. In my case I had both family and friends to support me to keep on working even under the hardest circumstances.

During the development of this Thesis I was gifted with a little baby girl, which, despite the increase of effort necessary take care of my baby and keep working my research, it was the greatest motivation I had to complete this final assignment.

Therefore, I would like to dedicate this work for my family and specially to my daughter, Ana Carolina.

ACKNOWLEDGEMENTS

I come from a family of entrepreneurs, both my mother and father have taken risks on doing business of their own, specially on the end of 80's beginning of 90's when the political and economic scenario in Brazil was quite unstable with high inflation rates.
When my family decided on working on the electrical field, focused on distribution only, they were exploring a very large but complicated market in Brazil.
Time has passed and after my studies I came back to my family's business, which is still on the electrical field, but have expanded from distribution products only to transmission and distribution and working with market niches that are on the beginning of their life cycle, with high technological requirements and high aggregated value.
Not only my family and I, but the market itself, have been looking for products that can adapt to renewable energy sources, have better self-efficiency and be accessible to all customers. I understand that the careful for the environment in crucial at this century and all society is looking for products and technologies that allow them to change their habits for more ecological friendly ones.
This work as the final step to the Doctorate program in Business and Administration on the University of Liverpool, is a result of my personal ecological concern on my working field using the knowledge basis that all the previous models that this DBA course has provided me.
I would like to thank Dr. Eleanna Kafeza, my supervisor during this thesis period, which has helped me develop the necessary skills to complete this research. Dr. Eleanna Kafeza has supported me and has been a great supervisor during this journey.
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ABSTRACT

Renewable energy technologies are becoming increasingly important due to uncontrolled exploitation of natural resources worldwide, by human beings, to sustain the current lifestyle. Renewable energy technologies development and acceptance is key to keep the current technological evolutionary pace with responsible use of natural resources.

This work is based on identification and test of constraints that have been retaining the acceptance process of renewable energy technologies in Brazil and testing these in organizational environment. For this purpose, the researcher has based its work on behavioural theory i.e. the theory of reasoned action (TRA) (Fishbein and Ajzen, 1975), and theory of planned behaviour (TPB) (Ajzen, 1985). With these in mind, the researcher has adopted the technology acceptance model (TAM) (Davis, 1985) and integrated some extensions to it regarding environmental attitude. The environmental view was considered based on the new environmental paradigm (NEP) (Dunlap and Van Liere, 1978) and the ecologically conscious consumer behaviour model (ECCB) (Roberts, 1996).

This research has adopted a mixed methodology using quantitative research and action research via learning sets, gathering data from the environment, referred to technological and environmental challenges identified by the society and using this data as information to an organization so that it could learn and develop new strategies that will help increasing sales of renewable energy technologies' based products. On the quantitative phase of this research, 132 Brazilian citizens living in the south and southeast area of Brazil, with an income not lower than 9 minimum wages, owning graduation degree, responded the quantitative questionnaire. The data collected was analysed using factor analysis and multiple regression which provided information for the Action Research phase, when the organization that participated used learning sets, conducted by the researcher, with a group of sales managers that analysed, debated, developed and applied ideas based on the data of the quantitative questionnaire, aiming the increase of sales of renewable energy technologies' products.

The results found consider the constraints of technological acceptance by usefulness or ease of use not high, but greatest challenges lies on price levels and environmental

attitude. By looking at these constraints during the learning sets, the organization managed to develop new working strategies for increasing sales of renewable energy technologies' products, such as working with the government for funding and help on price reduction levels and increasing user's environmental knowledge of the importance and benefits that renewable energy technologies' products can bring not only to their businesses but to society.

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Chapter 1: Overview

The concept of renewable energy has been accepted worldwide as energy that is obtained from “endless” natural resources, such as the sun, the wind and the water (Emspak, et. al, 2013). These natural resources are explored in a way to extract energy through their natural movement (windmills), state (sea waves) or created movement (hydroelectric). There is a large array of methods to extract energy from renewable energy resources, but the acceptance and usage of this technology is still very low considering worldwide consumption and the investments that have already been made to generate carbon and petrol energy so far.

The acceptance process of new technologies can be hard and challenging. In Brazil, organizations have been working towards increasing sales of renewable energy technologies based products, but the acceptance rate is still low.

The identification of the constraints that have been delaying this technological acceptance is important for organizations to increase their sales by properly adapting strategies for this market.

Considering this as the practice-based problem that generated this research, the problem statement to be explored is: What are the elements of user-attitude and environmental attitude that are retaining the acceptance process of renewable energy technologies in Brazil?

This is a mixed methodology research of quantitative state and action research stage. On the quantitative stage the researcher tested several elements of user-attitude and environmental attitude that could be retaining the acceptance process of renewable energy technologies in Brazil, followed by, an action research stage, conducted with a team from an organization that works with the energy field to try to influence this team, as a learning set, about how the constraints identified can be overcome by organizations. The identification and testing of the challenges presented to the adoption of renewable energy in Brazil should help organizations, institutions and government to improve products and external conditions to the needs of the final users. It should also lead to a more direct approach to the difficulties encountered and giving basis to discussions regarding what new ways, politics and incentives can be developed to speed up the migration process to renewable energy resources in Brazil maintaining economical and societal balance.

This is the presentation chapter of the subject in this study. It is structured by the presentation of the research problem, the objectives that the researcher aims to achieve with this work, the theoretical gap to be addressed in this research, exploration of the consistency among theory, research question and research objectives, and it finalizes with a brief exploration of the research approach adopted and an outline of the complete work being presented.

1.1 Theoretical Gap Presentation

Empirical research focused on predicting user acceptance and intention of usage of specific technologies using TAM (Davis, 1989) has been widely applied in many different areas by different types of research. TAM model (Davis, 1989) has its basis on the user-intention perspective analysis, which, per Venkatesh et al (2003) aims to perform the prediction of the user acceptance of a technology by analysing its intentions to use the proposed technology and actual usage of it.

The basis for the user-intention perspective lies on the theory of general behaviour entitled theory of reasoned action (TRA) (Fishbein and Ajzen, 1975) and theory of planned behaviour (TPB) (Ajzen, 1991). Despite the development of a wide variety of models to apply these theories, TAM (Davis, 1989) is one of the most used models, for the exploration of user-intention. Moreover, TAM (Davis, 1989) is widely used to provide the basis for different models for the user-intention testing under different circumstances and considering more variables than the ones presented on the original model.

On this research, the TAM model is used as a basis to investigate the adoption of renewable energy. Since several other factors are influencing such behaviour, the author also considers different aspects. For example, the author considers the environmental attitude regarding environmental concern. Measuring scales for environmental attitude is hard to establish due to the complexity of the matter (Bohlen and Diamantopoulos, 1993). The wide range of possibilities for interpretations is an issue, being environmental knowledge addressed as a major concern for environmental attitude measuring (Maloney et al, 1975).

With this issue in mind, in this research the measurement of environmental attitude is based on the variables of environmental perceived knowledge (Maloney et al, 1975) and environmental concern (Dunlap, R. E. and Van Liere, K. D., 1978). The idea is

that environmental concern and ecological knowledge are two connected concepts that result in the social responsibility and ecologically conscious consumer behaviour (ECCB) (Roberts, 1996).

The NEP scale (Dunlap, R. E. and Van Liere, K. D., 1978) was used to measure environmental concern, the environmental perceived knowledge scale (Bohlen and Diamantopoulos, 1993) to measure environmental knowledge and finalizing with the environmental attitude scale (Maloney et al, 1975; Bohlen and Diamantopoulos, 1993), With these parameters, it was possible to establish consistent and relevant research logic that can be used as basis of a user-intention perspective research to understand the tendency of ecological usage behaviour focusing on renewable energy technologies available in Brazil.

Therefore, this research explores the literature gap existent on the user-intention prediction research focusing on the usage prediction of renewable energy technologies in the Brazilian population, using as basis TAM (Davis, 1989) and using variables that allow the measurement of environmental attitude (Bohlen and Diamantopoulos, 1993). The researcher has structured this research based on the practice-based problem: What are the elements of user-attitude and environmental attitude that are retaining the acceptance process of renewable energy technologies in Brazil? This problem-statement reflects an organizational issue regarding the low level of sales of renewable energy technologies' products in Brazil, by identifying the elements that have been retaining the acceptance process and trying of sales strategy based on this, organizations should increase their sales on the related products.

The investigation of this research gap has important managerial implications for both private and public sectors in Brazil. They affect the private sector in a strategic sphere regarding level of investment in renewable energy technologies and types of technologies that are most likely to be accepted to the population tested considered not only their environmental attitude tested but also their willingness to learn the operation of these new technologies and spending extra for these. As for the implications of the public sector, these are also strategic considering the exploration of this literature gap can provide a level of clarification about the current environmental knowledge level and willingness to spend and use by the population, which would provide reliable basis for the development and/or focusing of investment programs in environmental knowledge as well as incentive programs for development of new and

existent technologies for their acceptance in the market and reduction of production cost levels of these products to increase their attractiveness to the final users.

1.2 Research Problem

The problem being explored in this research, aims to identify and test the elements of user-attitude and environmental attitude that are retaining the acceptance process of renewable energy technologies in Brazil.

The problem as stated above is too large to explore in one research only, it has many issues to be considered, explored and understood like social viability, financial viability and political viability (Assmann et. al., 2006), so it is important for the researcher to focus its conceptual model on one aspect to be explored.

With the understanding that the research question is focused on attitude, constructs like attitude towards use and the actual usage, the research has taken a behavioural focus, an action focus, which can provide the researcher theory ground to explore.

Using attitudinal and behavioural theories, by the TAM model - chosen for its wide use and acceptance and a valid and reliable model - did not seem enough in the sense of focus. Hence the researcher also adopted, still on the attitudinal basis, the construct of environmental attitude, to understand what is the degree of relevance environmental attitude has towards attitude towards use and actual usage.

All the constructs used will be further presented on the conceptual model development phase of this study, and all the constructs that based the hypothesis arisen will be discussed. In this phase of the research the theory that based this conceptual model will be explored.

Also it is important explore in this chapter the usage of action research as the base research philosophy practiced on this paper. The idea is to gather knowledge and action on the process, so that we can understand how the knowledge developed in theory will work in action. In this research the usage of learning sets and quantitative questionnaires will help to map if the conceptual model created and tested by questionnaire on a population reflects on possible management tools that are effective on selling products that use renewable energy technologies. Further development on action research will also be presented later this chapter.

1.3 Research Objectives And Expected Contributions

The presented research gap and research problem are the start-up point of this work. The main objective of this research is to identify the major elements of user-intention attitude and environmental attitude that are felt by the final users of renewable energy in Brazil which keep them from investing more of their time and money on the adoption of these technologies in their daily lives and test them in an organization with action research focusing on how organizations can change sales strategies to overcome these constraints.

On the quantitative stage, the research will look at a specific population in Brazil that has financial resources and enough access to information to choose among these types of technologies and evaluate them, understanding that the adoption process and life cycle of the products so far introduced to the market are on their early stages. On the action research stage, the information gathered from the quantitative phase will be used in an organization focusing on new sales strategies that will be effective to enhance sales of renewable energy technologies' products.

With these considerations in mind, the author of this research aims at the following objectives:

- To develop a conceptual model grounded on existent reliable theory that will account for the research domain required.
- To explore the constructs of the conceptual model
- To analyse the data collected by the exploration of the environment using the proper analytical tools.
- To apply the constraints found in an organization of the energy field, by learning sets.
- To provide market players with the elements that have been retaining the renewable energy technologies acceptance process in Brazil.
- To provide suggestions for the development of the renewable energy technologies in Brazil based on the research results.
- To open more research questions and possibilities based on the results and limitations of this research.

1.4 Research Limitations

This study, although a large one, has many limitations to be considered. The first limitation is geographical, this study will take place in Brazil and it is meant for the Brazilian market, considering its legislations, cultural aspects and market evolution for renewable energy technologies. This research is also limited to the upper classes in Brazil because the author considers that, since the renewable energy technology market is on its early stages in Brazil, the population analysed consists in the ones with the better access to information and financial resources to apply on this new market.

This research is also limited to the context of the organizational team participating on the learning set process. The results and influences that this team will suffer might not have a large impact when considering the entire organization and it is also limited to this team's own personal and professional limitations, such as educational level, knowledge of the market and decision power in the organization.

All these limitations in mind, the author argues about the high relevance of this research for major stakeholders of this market, product developers, organizations and final users, considering the understanding of the current scenario in Brazil regarding renewable energy technologies in the current economical, political and technological scenario. One last important relevance of this research is the process in action that will be conducted in an organization that it is part of the referred market and will cause change effect in its organizational team. That change can spread different ideas and working concepts with their colleagues in latter stages, causing a chain of changing events with power to achieve the organization itself.

1.5 Study setting and challenges

This action research was developed based on positivist philosophy, adopting mixed methodology using action research as research strategy. As a mixed methodology research, this work consists on both quantitative and qualitative data collection to provide solid basis for analysis, reflections and answering the research question. The quantitative data was collected on the Brazilian market final and qualitative data was collected from an organization that has a strong background and experience on the electrical market in Brazil, focusing on electrical transmission and distribution

products. This organization has been on the Brazilian market for over 30 years and has been following the Brazilian market development on these decades, its characteristics, developments and changes. The staff of this organization, therefore, has a good analysis basis for the current market answer to the new trends and technologies, which has been put on this research's core, presented on the learning set and critical analysis processes.

The author has been on this organization for 10 years, working on different levels of management, currently is acting on the role of International Business manager and has strong connection with the electricity market in Brazil and Latin America. The author has been observing, on the last few years, the slow and hard development of renewable energy technologies products in Brazil, which face many challenges, especially considering the lack of incentives for new technologies on the area, which makes these products not competitive for the market.

This research was developed to explore the matter regarding constraints that delay the development of renewable energy technologies products in Brazil, with the focus to map different constraints from financial support. The author had the question in mind, regarding the organization that she has been working on and the challenges that the author faces on daily basis to sell more efficient and environmental friendly products, other than price difference, since the price difference is resultant of many uncontrollable factors such as commodities pricing, governmental taxes and availability for credit from banks to these items. Therefore, the author understood that mapping other constraints might provide material for new sales and marketing strategy.

1.6 Structure of This Study

This study is divided in a structure of 6 chapters, each containing some extensive subchapters about the issue to be analysed. Chapter 1 is the introduction, and it consists of some subchapters that explore the presentation of the study, how it has been conducted, what is the research question and objectives, its importance to the researcher and community, the difficulties encountered in the development of this study and limitations it will present.

Chapter 2 is the exploration of this literature review used on this research. It will focus on the literature used for the development of the conceptual model of this research,

providing the necessary theoretical basis for the development of the following chapters.

Chapter 3 consists in the conceptual model development. The literature studied will meet the research question and will provide the conceptual model used by the researcher during the exploration of the research question and hypothesis, followed by the presentation of the research methodology chosen and the statistical analysis of the data collected, which will lead to acceptance or refusal of the hypothesis arisen.

In chapter 4 the results of the quantitative research will provide basis to the application of the learning set process in the organization chosen. In this stage, the process of learning set will be thoroughly described and the results of the action research will be presented and discussed.

Chapter 5 will consist of the qualitative stage of the research, starting from a presentation of the structure of the learning sets applied, description of the learning sets questions and answers, reflections and decision making processes of the team regarding actions that were taken to tackle different issues detected on the reflection process. This stage of the research shows the usage of the quantitative data collected on a qualitative reflection research stage.

Chapter 6 consists of discussion of all the findings in the research process and what kind on effect these had on the organization, which the action research was applied. It also contains the conclusion of this research. This chapter will explore not only a summary of all the research, but it will also consist in reflecting of the presented outcomes for the society and academy and will finalize with the limitations of this study and opportunity for new studies that have arisen.

Chapter 7 was developed as a chapter of personal reflection of this research journey as scholar/practitioner during this DBA. This chapter contains parts of the author's personal diary written on the process and personal reflections regarding different aspects of the work, ranging from the researcher's personal knowledge and understanding of the research topic, research question, the environment, professional experience and personal feelings of the research, what went right or wrong, what would the researcher do differently, themes that the researcher could not reach for different matters and other important aspects of the research process and the research itself that the author considers important sharing.

Finally, Chapter 8 consists of References used on the research and the appendixes are presented confirming the related research.

Chapter 2: Literature Review

Per Churchill (1979) before any conceptualization of construct and domains, it is imperative that the researcher should first review and analyse the existent literature on the matter. Therefore, this chapter consists of the literature reviewed by the researcher to provide consistent theoretical basis for the conceptual model, research question and hypothesis to be tested in this research paper. The first part of this chapter is a review of some relevant literature existent about Technology Acceptance Model (Davis, 1989). The second part of this chapter is a review of literature existent about environmentalism with focus on environmental attitude by the usage of research scales such as New Environmental Paradigm - NEP (Dunlap and Liere, 2008) and Ecologically Conscious Consumer Behaviour - ECCB (Roberts, 1996).

Finally, this chapter will be concluded with a review of action research literature focused on the methodology that will be used on this research. Then it will bring a discussion of the connection regarding TAM model and environmental attitude models and action research that were established for the conceptualization of this research, how it fulfils the literature gap and what it is expected to provide for future research themes.

2.1 Context of the Research

This section of the research aims to examine context-related positioning of the research. So far it was discussed about many theories of attitude with focus on TAM and models to measure Environmental Attitude, but none of these were put in a specific context to be applied, therefore it will be presented a brief analysis of the context of this research - Brazil.

One important gap of this research consists on the lack of a reliable paper that explored usage of TAM as a model to measure user's acceptance of RET in Brazil was not found. There are many studies that uses TAM to measure RET acceptance in small urban scale in other countries, like Malaysia, (Alam, et al., 2014) and (Kardooni, et al., 2015) these studies focus to investigate influencing factors of for the acceptance of RET and its impacts. These studies are recent and have provided some solid basis for the development of this work.

On the work of Alam, et al (2014), the researcher sought to understand purchase behaviour of renewable energy technologies in Malaysia, for that the researcher used attitudinal theory and model taking advantage of the reliability and flexibility that these provide, to provide determinants for the purchasing behaviour. This is a relevant study to be considered due to its similarity of this research regarding its goal.

Another similar paper is the work of Kardooni, et al (2015) where the researchers use the TAM variables perceived usefulness and perceived ease of use to explore the impacts of the variants of different costs of RET usage and knowledge level do adopt the new technologies. This is a relevant work for this paper because the financial impact and the knowledge lever regarding technological changes acceptance may have an important impact, these will be discussed on this research on later stages. On the work of Kardoon, et al (2015) the researchers found that there is a negative impact of these regarding higher costs and difficulty level, demanding a different knowledge level to understand and adopt renewable energy technologies.

Looking the context of this research, there are many papers that explore the acceptance and usage of RET in Brazil, such as the work of Sánchez et al (2015) where it was made a historical analysis of the electricity market in Brazilian Rural areas from 1999 to 2013, and the renewable technologies' acceptance historical, due to its technological evolution and its capability of local electricity generation on isolated areas. This research shows a positive acceptance, although in a low rate due to costs level, of the acceptance and adopting on renewable energy technologies on generation, transmission and distribution of electricity on these areas. Recently, there has been an important move on this market due to the historically lower costs of renewable energy technologies' based products for electricity generation on small scale, some government incentives and the enhanced work on organizations on these special markets. This is a relevant work for this study, not only because it was done on the Brazilian market, but to understand evolution of acceptance when justified by necessity of change.

Other studies look at the employment impacts of RET adoption Simas and Paca (2014), where the discussion of labour loss or creation was made for renewable energy technologies rather than fossil fuel technologies, this article have generated in index to demonstrate that the worry regarding loss of labour positions due to the shift of technology for energy generation is not valid, since these generate more jobs than fossil fuel technologies. This is an important issue to be considered, which is not

directly explored on this research, but as the discussion evolves the reader will see political issues to be considered regarding incentives of renewable energy technologies energy generation projects, which has one of its main barriers on the political setting the fear of diminishing jobs positions by encouraging a more efficient technology, which impacts directly on the final consumers' decision.

Another study by Emoji, et al (2015), which looks and compares the evolution of the Brazilian electricity's sector technology innovation in Brazil, comparing it to other countries and identifying the effects of the different initiatives had on different markets. This paper poses a relevance on looking outside of Brazil and stating important policies, as financial support, higher level of ecological responsibility of companies and taxes incentives for the adoption of renewable energy technologies on different countries, these examples pose that the technological swift is possible if the proper measures, in cooperation among government, financial institutions, regulatory agencies and companies are taken.

The next significant work was done by Oliveira (2016), where the researcher analysed the importance, on an ecological point, for low-carbon systems adoption and looks at innovation opportunities. Oliveira (2016) points that renewable energy technologies sources are not counting more than 30% of the electrical generation in Brazil, this is an important work to understand the magnitude of the Brazilian market, considering large scale energy generation, the Brazilian market already works with clean energy generation in large scale, basically using hydroelectric generation power, which has an important factor on low-carbon energy on the Brazilian energy matrix, but hydroelectric power still have a costly environmental impact on all the ecosystem surrounding the hydroelectric, the technology demand the flooding of a large area to provide space for the power plant, considering that there are other means of clean energy technologies that can cause less damage to the environment, such as solar generation, which is almost an greenfield market in Brazil.

The work of Guerra (2014) also looks at the Brazilian energetic matrix, its functionality for non-carbon technologies also presenting an analysis of future scenarios and changes up to 2030 on the energetic matrix regarding changes, considering not only the ecological impact of the technologies applied, but looking at higher demands of electricity for the years to come.

The only work that asks a related research questions is the work of Mallett (2009) aiming to understand the important factors that are influencing adoption in urban areas

in the developing world. To answer this question Mallet (2009) uses the city of São Paulo - Brazil and Mexico City (Mexico) and adopts the Roger's diffusion of innovation approach, does not use any attitudinal theory in her research, which is focused on political and economic aspects. This is an important research to look at, considering that the author analysis a similar research question with a different approach, he does not consider environmental knowledge as on this work or behavioural theory, he looks at political and economic aspects, and some of the analysis that will be further made on this research regarding the needs of political and economic change also reflect on this research.

Table 1: Research Context

Research Context

Author(s)	Summary Findings
Fonseca (2015)	This research aimed on understanding of possibilities and challenges for small organizations do adopt green economy. It concludes that there is a large importance for incubators and governmental special support and programs to help small organizations adapt to RET and green economy.
Ribeiro et al. (2015)	In this article the authors an integrated analysis and comparison system to be applied in case studies. In their application is was found that the amount of energy generated by renewable resources can highly be influenced by location, are and shape.
Guerra et al. (2015)	This article explores the trend of evolution of the Brazilian Energy Matrix, exploring possible mitigation scenarios, projecting demand and supply for 2030.
Oliveira et al. (2016)	This research focuses on developing a methodology, which will identify critical technologies for low-carbon systems and evaluate innovation opportunities. The researchers found that although fossil fuel represents a large role, renewables are no counting more than 30% of electrical generation.
Emodi et al. (2015)	This paper focus on a review of the past and current situation of the electricity's sector technology innovation in Brazil, later it compares the results with other countries to identify what different initiatives these had to influence attractiveness to renewable energy and finalizes recommending some policies.
Simas et al. (2014)	This article analyses studies that focuses in the job creations of RET, concluding that it creates more labour than fossil fuel technologies. These issues are not reliable due to many different contexts, so this article consists on the development of an index which is not based on installed capacity, but in production.
Sanchez et al. (2015)	The researchers analyse history of electricity distribution in Brazil from 1999 to 2013 in rural areas. The researcher discovers that RET has evolved during this time and became more accessible to rural areas, especially those with hard access to urban society.
Kardooni et al. (2016)	This research focuses on the analysis of RET acceptance in Peninsular Malaysia. The researchers use perceived usage and perceived ease of use to understand the impacts of cost and knowledge. The researchers discover that there is a negative attitude towards use of RET due to the high level of effort required.
Alam et al. (2014)	On this paper, the researcher examines the determinants for acceptance of small scale RET. These determinants are based on theory of planned behaviour, acceptance model and diffusion of innovation theory. This paper focuses on the understanding of the purchase behaviour regarding small scale RET in Malaysia and its rationale.

Source: The author.

In Brazil is was not found any work based in TAM, Environmental Attitude and Action Research on the related field, there is the general understanding in the articles that the most important influencing factor for RET adoption regarding end users is based in price, lack of information and availability. This research is being conducted on Brazil due to the low acceptance of RET by final costumers, and by mapping constraints that are standing in the way, the research will apply learning sets with the findings on an organization that sells RET products to help reshaping the selling process focusing on any changes of results.

The concept used on this research to emphasize the importance of focusing on Attitude is based on the work of Fishbein and Ajzen (1975) where they state attitude as a direct influence of intention which later influences behaviour. Fishbein and Ajzen (1975) worked on these premises, on the Theory of Reasoned Action TRA, which later evolved to Theory of Planned Behaviour (TPB) (Ajzen, 1985), Technology Acceptance model (TAM) (Davis,1989). Considering the focus of this research as Environmental behaviour, the models of New Environmental Paradigm (NEP) (Dunlap and Van Liere, 1978) and Ecologically Conscious Consumer Behaviour (ECCB) (Roberts, 1996) were added to the TAM model as additional variables to be explored specifically on this market, considering that one of the important issues that the researcher is looking to understand regards environmental attitude based on environmental knowledge.

The following sections show the evolution of these theories and the generation of these models, followed by some examples of how these have evolved over the years.

2.2 Attitude

The Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975) has its origins on social psychology and its focus on the mapping of the major determinants of individuals' attitudes or, also entitled, consciously intended behaviour (Davis, 1989).

Although there are many theories and ways to measure attitude, first one should understand that measurement of attitude towards an action is very hard, because attitudes are hypothetical constructs; for that reason, constructs of attitude are connected to behavioural responses. Therefore, following Azjen (1998) and his statement responses gathered should be evaluative, before starting to work on the measurement of the construct attitude, it is important to establish a strong theoretical foundation that should allow the operationalization of practical measures.

Allport (1935) stated attitude as the preparation or readiness for response, posing attitude as a predisposing behaviour. This leads researches to understand attitude as a measurement of readiness for action, but some other researches on this focus have proven that this direct link from attitude to action can be misleading, therefore the need for theories such as Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975) and Theory of Planned Behaviour (TPB) (Ajzen, 1985) which added some constructs of perceived behaviour that can help attitude measurement by controlling situations where behaviour is not completely under volitional control.

The very definition of attitude is very broad, it goes from the definition already presented by Allport (1935) as a readiness for response, to different definitions such as the one presented by Mednick et al (1975) as the predisposition to respond in a certain way regarding a certain environment and other people. With these definitions, it becomes clear that attitudes cannot be directly measured, yet they are inferred from attitudinal response, which should reflect the evaluation, positive or negative, from an attitude object.

2.2.1 User-Intention Perspective

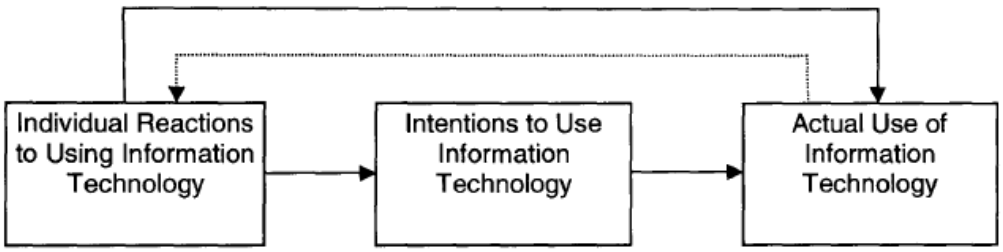
Considering this initial understanding of attitude and its difficulties of measurement, models have been developed to provide measurement basis for attitude based on the user-intention perspective concept.

User-intention perspective research consists in the investigation about the acceptance and intention of usage of final users regarding information technologies by the identification and mapping of attitudes that can influence this intention (Venkatesh et al, 2003). The main concept of user-intention

perspective is that by mapping a positive reaction regarding the intention of usage of a technology will lead to a positive actual use of the information technology in study.

The user-intention perspective has been extracted from the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975) which, per Baron et al (2006) is considered one of the most influential behavioural theories. regarding behaviour prediction. It is the concept that provides bases for many behavioural prediction models, the most used being Technology Acceptance Model (TAM) (Davis, 1989).

FIGURE 1: CONCEPT OF USER-INTENTION MODELS



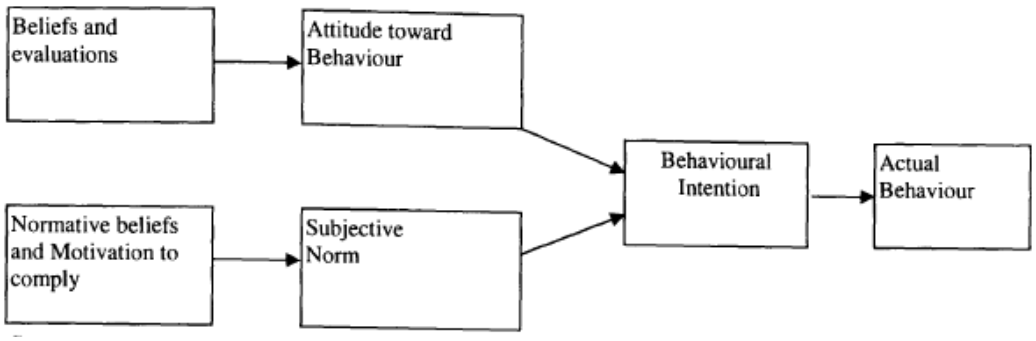
Source: Venkatesh et al. (2003, p. 427)

2.2.2 Theory of Reasoned Action (TRA)

The Theory of Reasoned Action (TRA) is originated from social psychology and it is focused on the identification of the determinants of attitude (Davis, et. al, 1989). It views attitude not only by itself, but in the context of belief, attitude, intention and behaviour series (Fishbein and Ajzen, 1975), meaning that behaviours are deliberated intention of an individual to perform an action. In the TRA, intentions are the precedents of behaviours, considering its predictive validity to an action, or, per Ajzen (1988) the intentions are motivational factors for an individual to perform certain behaviour, therefore are an indication of the amount of effort that a person is willing to put to transform an intention into an action.

Therefore, in TRA there are two variants that will determine behavioural intention and action, these are attitude towards a behaviour and subjective norm (Fishbein and Ajzen, 1975).

FIGURE 2: THEORY OF REASONED ACTION



Source: Fishbein and Ajzen (1975, p. 285)

Considering the structure of TRA as shown on Figure 3, the behavioural intention is the result of attitude towards behaviour and subjective norm, in other words, the behavioural intention is the strength that the individual is committed to perform an action (Warshaw, 1980). In attitude towards behaviour, the determinants are the personal beliefs and evaluation of the possible outcomes of a considered behaviour. As for subjective norm, the determinants are normative beliefs and external motivation to comply, or in other terms, the external social pressure that the person receives, the perception of the importance of the subject regarding third party desires to see the behaviour accomplished.

In the Theory of Reasoned Action (TRA), Fishbein and Ajzen (1975) assume that the reasons for an actual behaviour are always rational and motivation-based. Many different stimuli are considered valid to influence the individual's intentions. The first one is personal beliefs regarding the consequences of a behaviour and the evaluation of the consequences of these behaviours. Then, the individual's opinion about the likelihood of the evaluation of referent individuals or groups, regarding approval or disapproval of the behaviour in reference - normative beliefs (Ajzen and Madden, 1986); the subject's motivation to comply with what other individuals or groups think should be done.

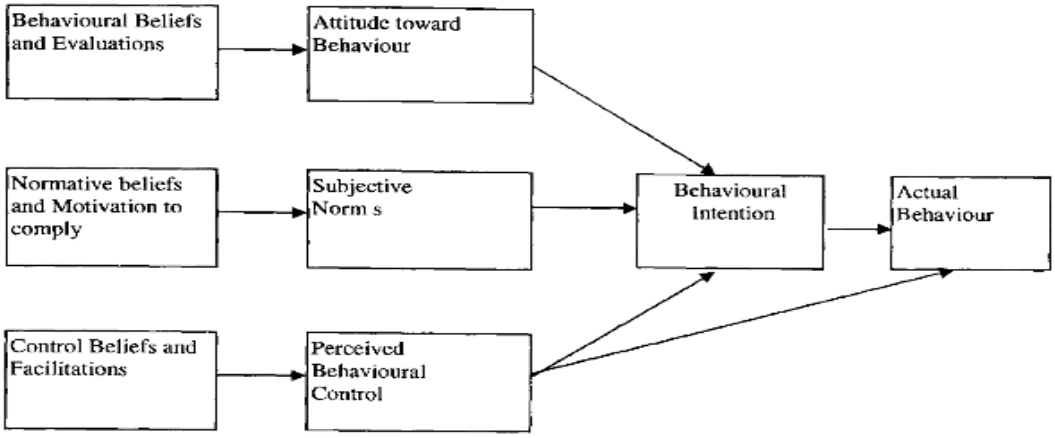
Still considering subjective norm, it is important to state that, considering on the type of action, the importance of a third-party belief (person or group) regarding the approval or disapproval of an action, can have a larger impact on the final decision than the own subjects' personal wishes or beliefs, leading this person to adopt an action even though it might not be favourable to him or her (Venkatesh and Davis, 2000).

Many criticisms have been presented on the Theory of Reasoned Action, concerning two points; The first one is about the limitations on the prediction of volitional behaviour control. The second is about the assessment of user's intentions does not provide necessary information to evaluate and form intentions in a rational way (Sheppard, et. al, 1988). This lack of control of the individuals over external factors and knowledge required to decide and take an action can be used by other parties to influence the decisions of the subjects, mischaracterizing the basic principal of the TRA which lies on rationality (Fishbein and Ajzen, 1975). In response for these criticisms, there was the development of the Theory of Planned Behaviour (TPB), an extension of the TRA by Ajzen (1988) with the addition of a variable for Perceived Behavioural Control.

2.2.3 Theory of Planned Behaviour (TPB)

The addition of the Perceived Behavioural Control (PBC) factor by Ajzen (1988) in the Theory of Reasoned Action (Fishbein and Ajzen, 1975), has originated the Theory of Planned Behaviour (TPB) (Ajzen, 1988). The importance of the Perceived Behavioural Control (PBC) factor addition is large because there are many situations by which behaviour is dependent on external factors that take away the volitional control of the subject, such as skills, time, money and others.

FIGURE 3: THEORY OF PLANNED BEHAVIOUR



Source: Ajzen (1988)

In the Theory of Planned Behaviour (TPB), Ajzen (1988) refers to the Perceived Behavioural Control (PBC) because of the beliefs about resources and opportunities and their likelihood to occur. The Perceived Behavioural Control factor should provide better control and higher degree of accuracy to the intention prediction.

Still following Ajzen (1991) the PBC factor should influence behaviour directly and indirectly. The direct influence is done by focusing on the subject's confidence and effort to commit to behaviour, thus influencing its performance. The link of these is evidenced by the non-volitional nature of behaviour plus the actual control reflected by the PBC (Ajzen and Madden, 1986). The indirect influence is characterized by the determination of the intention itself, which, per Ajzen (1991) is by attitude, subjective norm and PBC, therefore intention is an indirect determinant of behaviour.

With these in mind, one can easily conclude that the PCB factor consists on the measurement of the perceived ability of a subject to perform an action if he/she wishes so, diminishing the level uncertainty of the user-intention research that is being conducted.

The stronger the volitional control of the subject on the matter, the greater the likelihood of behavioural intention to occur (Traeen and Nordlund, 1993). It can be seen in the research conducted by Giles and Cairns (1995) where they found that the people who believe that they did not have the ability or skills to perform

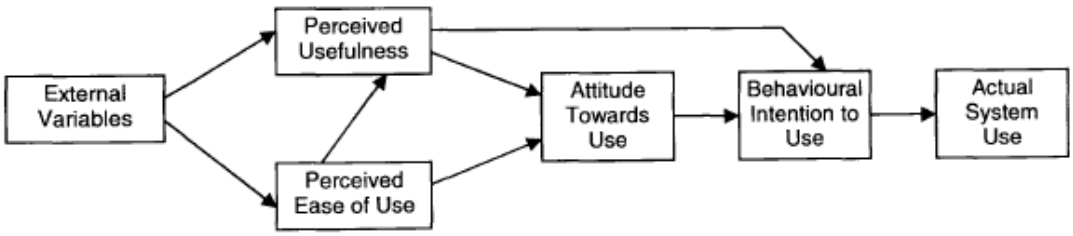
a blood donation where less likely to develop strong behavioural intentions, even in situations where measurements of attitude and subjective norms were positive/favourable. Another example is the research conducted by Godin et.al. (1992) where the researchers found that a smoker's intention to quit is influenced by PBC and attitude, whereas only PCB predicts the behaviour itself - quit smoking.

2.2.4 Technology Acceptance Model (TAM)

Initially developed by Davis (1989), the Technology Acceptance Model (TAM) focused on user acceptance of information systems, aiming to understand the determinants of user acceptance and helping on the explanation of the behaviour habits by users (Davis, Bagozzi and Warshaw, 1992).

The Technology Acceptance Model has its basis on the Theory of Reasoned Action (Fishbein and Ajzen, 1975), as the Theory of Reasoned action is focused on the impact of internal beliefs on external behaviours, so does the Technology Acceptance mode works, using intentions as the immediate precursor to behaviour. Intentions are measured by looking at features of the information system, which will impact on the user intention and on final acceptance/denial of the information system.

FIGURE 4: THE TECHNOLOGY ACCEPTANCE MODEL



Source: Davis, (1989)

It is possible to see that, although based on the Theory of Reasoned Action (Fishbein and Ajzen, 1975), the Technology Acceptance Model (Davis, 1989) presents many different aspects from TRA and from the Theory of Planned Behaviour (Ajzen,1988) which are important to be looked at.

The first main difference of TAM from TRA and TPB regards the testing method of the behaviour intention, which is done is a multidimensional way, using the factors of Perceived Usefulness and Perceived Ease of Use. These two factors are also not derived directly from each new context presented; they are more generalized factors on measuring the computer systems.

Another main difference regards the absence of the factor subjective norm, present in both TRA and TPB. The exclusion of the subjective norm factor is justified by Davis (1989) regarding the difficulty of detaching the direct from indirect effects of the subject norm factor, using attitude, from behavioural intention.

The next question that arises after the presented analysis regards the origin of the constructs presented on TAM (Davis, 1989). In TAM, Davis (1989) uses the constructs of Usefulness and Ease of Use, which were already developed in previous researches. The construct Ease of Use (EOU), per Bandura (1982) is focused on self-efficacy, which, on TAM (Davis, 1989), is explored as one of the motivational factors to attitude (Lepper, 1985). It can also affect Usefulness on the perspective that a system that is hard to use might not be used at all.

2.2.5 Application Of TRA, TPB and TAM

The usage of TRA has been widely used to explain consumer acceptance of information technologies over the past few decades (Venkatesh and Davis, 2000). TRA (Fishbein and Ajzen, 1975) is a solid and consistent theory that has been providing basis for other structured theories and models, such as TPB (Ajzen, 1988) and TAM (Davis, 1989), on user-intention research.

TPB (Ajzen, 1988) is an evolution of TRA (Fishbein and Ajzen, 1975) to overcome the non-volitional problems that have been mapped over time. It has also provided reliable basis for many studies regarding the user-intention perspective not only on the field of information systems (Matheison, 1991), but also on many different purchasing behaviour studies (Janverpaa and Todd, 1997). Although widely used, the TPB theory also has limitations considering that it is a very generalist theory, it does not link specific beliefs with behaviours, making the TPB theory only partially applicable (González-Bree, 2012).

Given all these considerations regarding TRA and TPB, the TAM model has been widely used on user-intention researches to explore antecedents that influence the user acceptance on information systems and many other areas (Davis, 1989; Taylor and Todd, 1995a). One of the major advantages of TAM regards its ability to better delineate the studied behaviour than TRA (Davis et.al, 1999) and TPB (Mathieson, 1991) by adopting a structure that is better decomposed, breaking down attitude, normative and control beliefs into constructs that are more multi-dimensional, providing a validity level that is more stable over time and simpler to understand and apply (Taylor and Todd, 1995). Moreover, TAM model is considered a model simple to apply and easy to understand (Taylor and Todd, 1995a) and, according to Venkatesh et al (2003) there is considerable empirical evidence about the high exploratory power of TAM and its ability to account for a high percentage of the user intention to use technology.

Finally, when looking at User-Intention Perspective research, one should consider both behavioural theories of TRA and TPB as the basis for the attempt to determine consumer intention to use technologies and, within these two theories, TAM model emerges widely used by researchers in the fulfilment of the intention prediction of the final users. TAM model was developed based on the attitudinal antecedents of Perceived Usefulness and Perceived Ease of Use, which provides TAM model with a weakness of lacking other important constraints for the user intention prediction. Despite the imperfection of TAM model, it is widely accepted and used due to its high exploratory power of user intention to use technology and its simplicity to understand and apply.

2.2.6 Discussion

After this analysis of the literature about attitude, theories of reasoned action, planned behaviour and TAM model, these are all concepts and models that academics have widely used and explored. The array of research and application of TAM model is large and its many variations developed supply the model with a great application flexibility on many different research fields.

During the development of Technological Acceptance (TAM) model, Davis (1989) used three motivator factors for users', the first was the hypothesis that

attitude towards use as a major determinant for the users' final acceptance of a system. Next he considered as main determinants for attitude towards use the beliefs of perceived usefulness and perceived ease of use. On a later stage, he adopted other variables to compose the relationship among the existing beliefs. Based on the Theory of Reasoned Action (TRA) model, Davis considered that actual usage is a behaviour, adopting TRA model as basis for TAM model and relied on several other studies to identify perceived usefulness and perceived ease of use sufficient to predict attitude towards use.

Some studies that he used were Schultz and Slevin (1975) which carried an exploratory study finding that perceived usefulness could be reliable on a prediction of use model, which was confirmed by Robey (1979) which found high correlation among perceived usefulness and system usage.

Later, Bandura (1982) suggested that best prediction of behaviour would be done by looking at self-efficacy and outcome judgments, stating the importance of both perceived usefulness and perceived ease of use. This relationship was also shown by Swanson (1982) where he showed evidence about both perceived usefulness and perceived ease of use as important behavioural determinants.

These studies lead Davis (1985) to conclude that attitude towards use would be positive if it helped the user's performance and the level of effort it would take for the usage.

As time passes, Davis (1989) understood important the addition of a behavioural intention, which would state the different of the intention of usage and the actual use of a system.

There are many citations on Davis' research on TAM model, some of them were cited on Table 1 and Table 2, in various fields. These studies provide support to the TAM model as a reliable behaviour-prediction model. There was also the development of TAM 2 by Vankatesh (2000), on which he identified previous groups of antecedents to perceived usefulness and perceived ease of use.

Despite all this positive results on TAM model, there are some scepticism regarding limitations on the methodology used on the testing of TAM, as in the fact that data is measured by system used instead of real actual data, which poses that many studies were made on controlled environment and cannot be replicated on the real world. (Lee, Kozar & Larsen, 2003) considering that in

real life, organizations demand the usage of a system with little or no alternatives; other important limitation regards the variables and their relationships on the model, a study conducted by Yang and Yoo (2003) suggesting additional affective attitude and cognitive attitude which resulted on the high significance of the cognitive attitude variable, another important study by Brown, Massey, Motoya-Weiss and Burhman (2002) replicated a field study on the banking industry considering mandatory system use, and found perceived ease of use having an important impact on perceived usefulness, contrary to Davis (1985) prediction; finally Burthon-Jones and Hubona (2006) conducted a study on a Government agency and found other important external variable such as education level, age and system experience, that have direct influence on system usage.

The last limitation regards the theoretical foundation of TAM, stated by Bagozzi (2007) where he stated behaviour should not be considered a terminal goal, but as means to a more fundamental goal, between the period of intention and adoption there are many other uncertainties and factors that can influence the final decision, he also stated TAM as deterministic, posing it on as assuming individual act as completely determined by intention, disregarding possible evaluation and reflection that may cause reformulation of ideas and actions.

All these limitations are important to be considered when using TAM model, but still is a model widely accepted and explored and has generated many results, the main issue to consider is that there are no models that can predict all variables that may influence a final action, limitations are important to generate other researches that looks into different variables for other conclusions; one must also consider that human behaviour is not always rational, emotional and situational variables are very hard to track on all different situations.

On this research, TAM model will be used for a research based on an environmental attitude, which lead the researcher to add extra variables on the model that could influence the final action of users. This is a large gap that is being explored in this research, not only the author wants to understand the constraints that have been delaying the RET acceptance in Brazil, but also the author wants to explore this research question using TAM model and environmental attitude as basis for the research.

The following table presents a brief description of the all the related work that has been used to fill in the literature gap so far.

This table was used to help the development of this literature review and empirical analysis of TAM, for a full understanding of positioning of the research, which will be further discussed in the research framework and statistics chapter.

Important works presented on this table starts from Davis (1989) where the author explores the connection of Perceived Usefulness and Perceived Ease of Use, and their relation, as put before, and important factor for actual use. The work of Mathieson (1991) where it was analysed TAM model with Theory of Planned Behaviour TPB and concluded TAM as a faster model to obtain results but TPB is better in its complexity due the consideration it takes to individuals and groups' feelings.

The work of Legris, et al (2003) which proved the efficacy of TAM model for information systems and looks at its evolution over time, as previously presented, and its many variations for many different fields of study, and finally the work of Turner et al (2010) where the points Behavioural Intention and more connected to attitude than Perceived Usefulness and Perceived Ease of use, using again Theory of Planned Behaviour and emphasizing the gap existent between the intention to use and actual usage. These works demonstrate, as previously stated, the evolution of TAM model and its changes that it might suffer under the next years with more different behavioural-attitudinal studies development.

Table 2: TAM Research

TAM Research

Studies	Focus	Framework	Methodology	Findings
Davis et. al (1989)	Development and validation of measurement scales for the variables Perceived Usefulness and Perceived Ease of Use.	Use literature to provide definition for PU and PEU, which will be used to the development of a scale to be tested.	Quantitative test of the developed scales in a sample of 152 users and 4 application programs.	PU significantly correlated to self-reported current usage and self-predicted future usage. PEU correlated to current usage and future usage. Usefulness presented a greater correlation with usage than did ease of use. PEU may be antecedent of PU.
Turner et. al (2010)	TAM model was developed as means to predict technology used, but is being validated by Behavioural Intention to Use (BI).	Examine evidence that TAM can be used in subjective and objective measures to predict actual use.	Systematic literature review and meta-analysis by vote counting.	BI is correlated to actual usage. The variables PU and PEU are less likely to be correlated to actual usage.
Mathieson (1991)	Comparison between Tam Model and TPB in the prediction of individual's intention to use.	Map and explore the difference between models establishing criteria for evaluation	Qualitative research based on a questionnaire applying both models.	TAM model gathers information more quickly and inexpressive, more used for measurement of general satisfaction levels, while TPB provides specifics, details of why individual or group are feeling.
Legris, et. al (2003).	Provide critical analysis of research methods, highlight convergence and divergence of resources and bring out added value of TAM.	Use TRA and TAM to propose other variables that will directly influence attitude, subjective norm, PU and PEU.	Empirical research, analyse existing articles to find and analysed already tested variables.	TAM has proved its efficacy, as a theoretical model, to understand behaviour in Information Systems implementation and use. TAM has evolved over time, including different factors that also influenced use.

Source: The author.

2.3 Environmental Attitude

Global environmental problems are being highly discussed today and the relationship between environmental attitude and ecological behaviour has been well explored by scientists (Kaiser, 1996) in the attempt to answer questions focused on how can behaviour be changed into a more ecological direction.

Per Kaiser (1996) there are mainly two types of environmental attitude approaches that are commonly used in the prediction of ecological behaviour: attitude towards the environment and attitude towards ecological behaviour (Hines et al., 1986), in both the focus is attitude towards natural environment or ecological behaviour.

Bearing in mind the previous review on attitude literature and the Theory of Planned Behaviour (Ajzen, 1988), the belief and motivations for behaviour and its intentions to occur, it is possible to understand environmental attitude as an approach of multiple components. They can be cognitive, affective and intentional (Rosenberg and Hovland, 1960) based on behavioural theories such as TRA (Fishbein and Ajzen, 1975) and TPB (Ajzen, 1988). TRA and TPB which are not the only social-psychological framework that have been used in the development of models to measure environmental attitude, another used theory of human behaviour is the norm activation model (Schwatz, 1977).

2.3.1 New Environmental Paradigm (NEP)

Built on the behaviour and attitude theories, some different approaches on how to measure environmental attitudes have been developed. Some use components (intention, knowledge and affect) in parallel and some aim to measure single components at a time (Arbuthnot, 1977). This is the case of the New Environmental Paradigm (NEP) (Dunlap and Van Liere, 1978) developed for testing ecological behaviour, situational and emotional variants, as a one-dimensional component measurement model for environmental attitude.

The development of the New Environmental Paradigm (NEP) by Dunlap and Liere (1978) was based on the attempt to challenge the concept of Dominant Social Paradigm (DSP) described by Pirages and Ehrlich (1974) as values, attitudes and beliefs that guide societies' interpretation of the external world. The researchers Dunlap and Liere (1974) were not content with the general understanding that

environmental problems were a result of traditional values and beliefs of each society, and considering the collective anti-ecological view of society at the time, the researchers understood the importance of this concept to avoid future ecological problems. Dunlap and Liere (1978) believed in the individual responsibility to take care of the environment. With this concept in mind, they developed the New Environmental Paradigm – NEP (Dunlap and Liere, 1974), which has emerged as an accurate method for analysis of environmental attitude and develop studies that would provide basis to change beliefs about the environment in a personal level (Dunlap et al., 2000). It does not consider dimensions such as Balance of Nature, Limits of Growth and Humans over nature (Vining & Ebreo, 1992) but focuses on the understanding of moral values that will guide an individual's environmental attitude.

Since its development, NEP has been widely used on environmental attitude studies, behaviour and ecological knowledge with many different groups such as secondary school students (DeChano, 2006) college students (Rideout et al., 2005) and its relationship with other models, such as NEP and ERB (Mobley et al., 2010).

As all models, the NEP scale has its limitations, in this case it regards capability of measurement of specific behaviours (Corral-Verdugo et al., 2003) and individual environmental concerns (Dietz et al., 1998), which has lead researchers to develop many variations of the NEP scale, adapting to the different needs of its different conditions applied. Another limitation important to state is the lack of relation between NEP and ecological behaviour, which varies from non-existent to weak (Kaiser, 1996).

2.3.2 Ecologically Conscious Consumer Behaviour (ECCB)

Another attitude model important to look at is the Ecologically Conscious Consumer Behaviour model (ECCB) (Roberts, 1996). This model was developed based on the changes in consumer behaviour the 80's presented by Vandermerwe and Oliff (1990) such as diffusion of green products to mass markets, consumer preference on green firms, consumer demand of recycled products, increase number of green products, concern for environment started to achieve different demographic categories. Roberts (1996) work was developed focusing to understand the attitude-behaviour gap that exists in green products consumption, with a model that explores ecological consciousness and its relationship to the consumption habit of a society and it is so far amongst the most used models on the field per Quieroga et al (2005).

The ECCB scale was developed based on a literary review of the existing model and a trial with 582 costumers in a specific market that helped Roberts (1996) confirm the hypothesis and connections among the variables of Perceived Consumer Effectiveness (PCE). It is defined as measure of the judgement of an individual about his/her ability to affect environmental issues by his/her consumption behaviour (Antil, 1978). Environmental Concern (EC), is the measurement of concern of an individual for the environment which will lead to an environmental conscious consumer (Van Liere and Dunlap, 1980) to finally test and confirm the ECCB model.

2.3.3 Environmental Attitude, NEP and ECCB

Environmental consciousness and changes in the consumption patterns for ecological products have increased over the last few decades (Roberts, 1996). It has lead the researchers to develop environmental attitudinal scales that can allow not only academics but also organizations to measure this pattern shift of societies, which would than provide reliable tools to respond to these changes accordingly.

The NEP scale (Dunlap and Van Liere, 1978) and ECCB model (Roberts, 1996) were both developed based in environmental attitudinal analysis and variables such as perceived consumer effectiveness (Antil, 1978), environmental concern (Van Liere and Dunlap, 1980) and although these models have been widely accepted and used their limitations consist on their level of specificity on individual behaviour and unidimensionality, leaving behind other important variables for measurement of the influence of the society on individual behaviour (Dunlap and Van Liere, 1978).

Despite the limitations, NEP and ECCB are widely used by researchers and provided basis for this research's conceptual model development and hypothesis testing as will be described in the next chapter.

2.3.4 Discussion

The usage of Environmental Attitude in this research has a main role on the understanding the power of environmental knowledge over attitudes, which means, does environmental knowledge have the power to affect attitudes? Considering that environmental knowledge is composed by many factors like legal, financial, personal and political, the researcher questions how can these factors contribute on environmental attitude? What other factors can have influence on environmental

attitude? These questions will be explored on the next chapters of this paper. The author would like to phrase here that the literature presented used to understand what is environmental knowledge and its depth, papers that present scales of measurement of environmental consumerism in patterns in society and personal levels under different circumstances.

As discussed on the previous sections regarding attitudinal theory and TAM model, the addition of environmental knowledge and environmental attitude was a choice made due to the research focus to analyze environmental attitude change considering level of environmental knowledge. The New Environmental Paradigm NEP (Dunlap and Van Liere, 1978), although a model developed some time, it is still applied for its reliability of results, Dunlap and Van Liere (2008) published an important work regarding the NEP scale, considering it still relevant to the recent reality, but it should be used carefully, depending on the context, due to the change of society's level of environmental consciousness development since its creation. Per Anderson (2012) analyses the development of the NEP scale regarding the scenario evolution, advocates understand that NEP scale scores will suffer a shit on when there is progress on sustainability, posing the NEP scale into an important progress metric of sustainability.

The author applied Ecologically Conscious Consumer Behaviour model (ECCB) (Roberts, 1996) to an additional exploration regarding looking at individual level regarding environmental consumer behaviour, adding a scale regarding individual level is important to a TAM model, considering that the conceptual model of this research is based on a model that disregard individual level feelings and behaviour, looking at consumer habits focused on individual behaviour adds an important part to the conceptual model.

Some researchers cited on Table 3 regards work development on ecological consciousness and its different aspects. The work of Ellen, et al (1991) was developed was a mixed methodology research developed to explore the apparent confusion of Perceived Consumer Effectiveness (PCE) and socially conscious attitudes, on this research Ellen, et al (1991) pose the importance for private and public policy makers to clarify consumer perceptions, since consumers may understand ecological claims as opportunistic. Although this is a research from 1991, facing this kind of experience when attempting on an ecological argument for selling eco-friendly products is still a reality.

The next work presented was developed by Bohlen, Bodo and Diamantopoulos (1993) where the researchers used large-scale existent data basis to try to develop an individual level variables to measure environmental concern. Some variables were developed and considered reliable by the researchers when linked to some criterion.
Next the work of Diamantopoulos, et al (2003) taking place in UK, it was developed aiming to explore if social-demographics still play a special role in profiling green consumers. By using quantitative research, the authors found, despite that many hypotheses were refuted, that different legislation and structure of environmental movements from countries influence the green consumers' characteristics. This is a relevant work considering that, on some cases, the perception of a population might change from different economic and political environments and policies adopted.
This subchapter of literature review was developed for presenting the basis of this scales used on the quantitative research, what they measure that why these are important to the success of this research. Some new factors may appear on the during the learning sets, which is will provide the researcher and the organization in which this research is being applied more material for exploration in both academic and practical matters. These might open path to new researches as well as different ideas to be applied by the learning set team improving results in the organization.

Table 3: Environmental Attitude Research

Environmental Attitude Research

Study	Focus	Framework	Methodology	Findings
Dunlap, Van Liere (2008)	Analysis and measurement of the acceptance of NEP by society.	Analysis of the extent to public acceptance of the content of NEP and develop/validate an instrument to measure it.	Qualitative. Questionnaire applied with 407 valid answers.	The researchers managed to develop a scale that measures the acceptance of NEP in the society. The researchers understand the context importance on the application of NEP scale and urge caution in its usage, but are optimistic with the results presented and the changes in the society mind (in the specific context).
Bohlen, Bodo and Diamantopoulos (1993)	Development of variables for targeting environmentally-concerned/aware segments of the population.	Use data from previous large-scale researches as basis to develop measures individually based.	Establish the face validity, dimensionality, reliability and construct validity of the measures.	Environmental measures developed and tested in a specific context. Measures could use some more validation if linked to some criterion.
Ellen, et. al (1991)	Explore the apparent confusion of Perceived Consumer Effectiveness (PCE) and socially conscious attitudes.	Empirically test the belief that PCE and Environmental Concern and distinct.	Mixed methodology using questionnaires and live tests based on personal attitudes when exposed to a situation.	Both public and private policy makers should enhance consumer perceptions for individual environment improve. Consumer understanding that environmental claims are exaggerated or opportunistic, making hard to make good choices.
Diamantopoulos, et. al (2003)	Explore if social-demographics still play a special role in profiling green consumers.	Review literature and develop hypothesis to be tested by questionnaires applied in the UK.	Quantitative, questionnaire applied in UK with valid results of 488 respondents.	Different legislation and structure of environmental movements from countries influence the green consumers' characteristics. Many of the hypothesis were not supported due to low reliability of methods used.

Source: The author.

2.4. Conclusion

Studies of attitude and behaviour have its basis on social psychology that which were focused to map the determinants of an individual behaviours and conscious made decisions. The attitude study has many theories developed and this research has focused on the theory of reasoned action and planned behaviour.

The theory of reasoned action (TRA) focused on identifying determinants of action analysing not only rational motivation, but also context, intention and behaviour series that the user uses to take an action (Fishbein and Ajzen, 1975). The variables that have been identified by the researchers when developing TRA theory were subjective norm and attitude towards behaviour.

The next theory that was explored in this literature review is the Theory of Planned Behaviour (TPB), which has basis on the concept of Perceived Behavioural Control (PBC) Ajzen (1988) which is defined as looking at behaviour because of beliefs, resources and opportunities presented to the subject. In TPB the PBC can influence behaviour directly or indirectly, thus PBC is a factor that measures the likelihood of the performance of an action by the subject if it so wishes, which diminishes uncertainly present on the TRA.

The TRA and TPB have been used by Davis (1989) as the theoretical basis to development of TAM model. TAM model was developed to explore user-intention behaviour in the acceptance and usage of computer systems by users in organizations. It is widely used for many other user-intention researches because of its unique measurement characteristics, which are multidimensional, by the usage of the factors Perceived Usefulness and Perceived Ease of Use, which focuses on self-efficacy and can also affect Perceived Usefulness, considering that a computer system that it is not easily operated might not be used at all.

After the analysis of TAM model and TRA and TPB theories, this literature review is presented with environmental attitude theory, which can be understood with basis on TRA and TPB as an approach of these theories basing on cognitive, affective and intentional behaviour towards the environment, which will lead to other models developed for its measurement and understanding.

The models presented on this literature review are NEP and ECCB.

The New Environmental Paradigm (NEP) model developed by Dunlap and Liere (1978) is a widely-used model for measuring environmental attitude due to its consideration of many variants such as cognitive, social, psychological, situational and emotional factors that can influence attitude towards the environment.

The Ecologically Conscious Consumer Behaviour model (ECCB) was developed by Vandermerwe and Oliff (1990), who were motivated to understand the consumers' attitude towards acceptance and usage of ecologically friendly products.

Once again, it is important to understand the connection of attitudinal theories presented such as TRA and TPB, TAM model with environmental attitude and NEP and ECCB model. The connection of these has not been found in the existent literature and the research is using TAM model as a strong base model for this research to be complementing ECCB and NEP scales to explore consumer acceptance and usage of renewable energy technologies. TAM will provide to the conceptual model of this research important characteristics of Perceived Usefulness and Perceived Ease of Use to be analysed with other characteristics such as Environmental Concern. That will complement the measurement of actual use of renewable energy technologies considering not only environmental knowledge and consciousness, but also self-efficacy and usage of the available renewable energy technologies on the market.

Chapter 3: Research Methodology

The definition of research methodology starts with research philosophy chosen by the author. This is a very important part of the research process, by defining the research philosophy, the researcher is also defining the research's approach, methodological process strategy to be adopted on the research, meaning that the research philosophy plays an important role on shaping different aspects of the work.

The author has adopted a positivist philosophy, a philosophy that relies on knowledge based on reason and logic, even when undertaking mixed methodology approach, where introspective or intuitive knowledge was not considered, the participants that to put on test their assumptions and generate actions based on reactions on their work field. The choice for a positivist research philosophy poses the researcher's view of the world, or ontology, external, independent and objective. Another important element to be consider is epistemology regarding how the knowledge should be obtained and justified, which will be seen by the objective look on the findings, in both qualitative and quantitative methodology, and the external position of the author, on analysing the results.

As for the methodological choice, this work has adopted mixed methodology. Per Creswell, Clark, Gutmann, and Hanson (2003), who define mixed methodology as a study where the data collection is made by both qualitative and quantitative methods. These can be used concurrently or sequentially integrate data of one or several stages of the study.

According to Coghlan (2011) action research is an inquiry process based on behavioural science that is applied in collaboration with existing organizational knowledge focusing to solve an organizational problem, putting together competencies and scientific knowledge.

The usage of mixed methodology in action research is discussed by Ivankova (2015) as an important element to promote the integration of different sources, which used alone, might seem gross but put together can add a finer combination of information that will allow a more rigorous and relevant research.

3.1. Action Research

Following Brydon-Miller, Greenwood and Maguire (2003) action research can be defined as a participatory process focused on the development of practical knowledge that will help on practical purposes using a democratic philosophy. It seeks to gather theory and practice, action and reflection, in participatory processes looking for practical solutions for the problem being discussed. It is now easier to understand the importance of action research and how it allows the researcher, with its flexibility, to make usage of academic theoretical knowledge in an organization, such process can provide opportunities to develop both practical and theoretical knowledge that can be used in both academy and organizations.

Although action research might not seem fit for positivistic philosophy, the interpretation of the data collected, as in objective, and how the researcher must be external on the reflective process, allows the usage of action research on a positivistic philosophy research.

Action research works in cycles denominated by Coghlan (2011) “cycles of action”, to emphasize the importance of reflection in action research, which, by the cycles of action, differentiate itself because of its simple data collection and analysis research. In action research, it is important to collect the data, analyse it, reflect upon it and look at what and how it impacts on the research problem and propose a way to solve it in action practice, finally the cycle of action closes itself on the application of the idea developed based on the first cycle and its analysis on how it has impacted on the research problem.

When working with action research, the researcher plays the roles of first person, second person and third person. The first-person role, or first person practice, consists on the exploitation of the deep involvement that the researcher has with the problem itself, other than being objects from outside, observers as in the other research methodologies. In the action research the researcher is deeply involved with the problem and the reflections and decisions made along the way, influencing and taking part of the learning experience. (Coghlan, 2008). As for the second person role, it exists because the researcher has a high level of interaction with the organizational team building relationships, which leads to the third person role which consists on the process of, with these relationships developed with the organization team, the next step is enquiry, questioning and engaging on a reflective process with the staff

involved.

The next important characteristic of action research to be considered refers to the diversity concerning the many ways that the interaction among the members participating on the research can occur. Following Brannick and Coghlan (2010) research has been changing to a more heterogeneous and reflexive way, focusing on its application to the context. Consequently, the diversity of the action research can be used in favour of the researcher and the organization, considering that it makes the process more flexible and thus allowing the producing of knowledge for the context application more easily. Still, focusing on this diversity issue, in order to ensure that the research process is rigorous enough, the researcher adopts tools for the development of the learning sets with the team and the register of information that will provide the structure required for the rigorousness of the research process, keeping the flexibility characteristic of the action research with a little more structure, using tools as diaries, interviews and discussions lead by a series of questions and observations previously developed under the bibliographical knowledge acquired.

To attend this flexibility, many variations of action research were developed over the years, such as participatory research, action learning, action science, cooperative inquiry and others. All these different action research philosophies are justified by Cassell & Johnson (2006) as different types of philosophical commitments and criteria, due to the infinitum array of knowledge investigation that can be studied by action research in organizations. These differences can be categorized into experimental, inductive, deductive and participatory, and depending on the philosophy adopted by the researcher, a different action research will be used.

Finally, when talking about action research one is talking about change, on the action research that is being described in this thesis, the type of change that is being proposed is focused change (Coghlan and Brannick, 2010), where the change that is proposed in the organization focuses on a very specific issue that is being studied – renewable energy technologies. This focused change can be spread through the organization, but it should not make a significant change on the whole organization in the strategic level. This proposed change should lead organizational members to rethink the way the organization is dealing with renewable energy technologies and what changes are necessary to adapt to the current needs and demands of the market and of the organization internally.

The author, on the development of this research, has adopted action research which focuses on developing the research process based on action, real problems, and with these, generating more action as tests for proposed solutions for the problems found on the reflective process of action research, Pedlar (1997). Looking at the problem-based approach adopted by the author, this research used mixed methodology methods for the data collection process.

3.2 Mixed Methods Research

Mixed methods research is a widely-used research method which can be defined as the methodology where the researcher gathers different aspects from quantitative and qualitative research approaches focusing on enhancing breadth and depth understanding and corroborating of the data collected (Johnson, Onwuebguzie, & Turner,2007).

The mixed method research approach focuses on complex research questions which, to be appropriately examined, demand real-life contextual understanding, multi-level perspectives and cultural influences exploration. Mixed methods approach, concerned about the reliability of the data collected and how it can be compromised on a complex research process, uses rigor on quantitative and qualitative data collection design for assessing relevance of the constructs applied on the research, as well as exploring, in depth, its meaning on the research context. It does so by using appropriate tools, such as intervention trials, in-depth interviews and other reliable and accepted data collection methods which, as its main differential, intentionally combine these focusing at each's strengths brought for the research consistence, relevance and depth and framing the investigation within philosophical and theoretical positions.

The philosophical approaches on mixed methods can be diverse, mainly focusing on post positivist and social constructs, pragmatic perspective and transformative perspective (Greene, 2007). This difference on the philosophical approach by the researchers can generate some tensions (Greene, 2007) but it can also be understood as an opportunity of transformations of doubts and tensions into new knowledge. As per Morgan (2007) for researchers with a more pragmatic philosophy, the idea is to focus on the research problem valuing both objective and subjective knowledge; finally, for Mertens (2009) on transformative perspective, the concept of mixed methods is a tool for generation of a just society by using mixed methodology on all

the research process. The philosophical approaches of mixed methodology see the research process and research questions with a broader perspective, understanding that both quantitative and qualitative data collection can be used together for a knowledge generation process that considers wider perspectives. It is also important to mention that rigor for mixed methodology is an important concern, although it is possible to use both quantitative and qualitative data gathering processes for the same research question, it is al so very important the comprehension of the researcher regarding when mixed methodology is the appropriate method for the research question and research limitations, such as time, financial support and resources available.

Another important issue to be pointed for mixed research is the opportunity for the integration different theoretical perspectives to be used on the same research. On this this work, the researcher combined ecological theories with behavioural theories on the development of its conceptual model, whereas both questionnaire applied on the quantitative data collection stage, and problem statement and reflection on the qualitative stage of the research, both had the mix between behavioural theory and ecological theory.

3.2.1 Data Integration

Mixed methodology is characterized when researchers intentionally integrate or combine both quantitative and qualitative data collection methods using systematic integrative procedures, which differs from applying separately quantitative and qualitative data collection or combine these casually. The driver for such approach is the maximization and strengths and minimization of weakness on the data.

Although data integration is challenging, there are some well accepted approaches for this process, such as merging data, connecting data and embedding data (Creswell & Plano Clark, 2011).

3.2.1.1 Merging Data

When a researcher adopts the approach of data merging in a mixed methodology research, it is done by the combination of quantitative data in numeric information and qualitative data in the form of texts or images. Reporting these data together on the

discussion section of a study, structuring first the quantitative data numbers followed by qualitative data to support or refuse quantitative data results is one way of merging data, as per Sandelowski, Voils, & Knafl (2009) another way is to develop a datasheet so that qualitative research can be compared with a quantitative datasheet (e.g. datasheet counting occurrence of themes presented on the qualitative set).

One example data merging can be found on the study of Wittink, Barg and Gallo (2006) where they studied the concordance and discordance amongst physicians and patients about depression status. The researcher used as parent study the Spectrum Study (2001-2004) by NIMH. On it data was collected on patients aged 65 and older, where the quantitative data consisted on depression reports of physicians and the patients themselves; as for qualitative data, it consisted on semi-structured interviews with patients. On the analysis of the quantitative data, measurement scales did not differentiate patients that were rated depressive or not by from physicians, whereas the qualitative themes have managed to identify typology of different emotions and feelings by the patients towards the physicians, and such differences were examined in a table. If the analysis of the investigators were made only with one type of data, the study would have not found this link between physicians and patients and how these can alter the depression and anxiety perception of each party.

3.2.1.2 Connecting Data

On connecting data approach, the integration occurs on connecting the analysis of a result from a previous data collection stage to the second phase of data collection of the research. On this process, the researcher analyses a datasheet and uses its information on a subsequent data collection (e.g. interview questions, identification of participants to interview).

An example of connecting data approach is on Dawson et al. (2002-2009) reported by Stoller et al. (2009) on non-abusive drinkers with hepatitis, where the study was conducted with a qualitative stage using interviews and Internet postings to discover decision factors on curtailing alcohol consumption. Such information was later used as data for assessment of prevalence of new factors and their connection with drinking.

3.1.2.3 Embedding Data

For embedding data approach, the author uses a secondary dataset to embed a primary design. One example of this research design would be the usage of a qualitative dataset to be used as basis for an experimental trial, such as in the case of Miaskowski et al (2006-2102) where the idea was to compare different doses of intervention of psycho-educational in nurses of the assistance of pain management on oncology patients. On later stages the researchers gathered qualitative data on the form of tapes on intervention sessions, the results were an evaluation of both outcomes and process intervention.

3.2.2 Usage of Mixed Methods

The researchers' decision for the research methodology to be used must be well evaluated, for the methodology can alter completely the research's depth and final outcomes. Choosing the inappropriate research methodology is a mistake that authors cannot make, it can completely change the course of the research of even produce invalid information.

Considering mixed methodology on a research is already a challenge, for it demands an extra effort on the data collection process in different ways, may demand extra time and resources.

The decision for a research methodology is connected to the research problem, the investigation method must fit the research problem. Looking at mixed methodology, research problems that require this research design are question where the application of only quantitative or qualitative approach are inadequate for the development of multiple perspectives and complete understanding of the research problem.

There are many reasons to choose mixed methodology, such as the wish to consider a problem on multiple perspectives to better understand single perspectives, like taking a macro view of an issue and contextualizing it into single points or individuals; another reason is to expand databases, using one already existent to build another; to compare and validate results; to provide illustration for trends; to examine processes/experiences along with outcomes (Plano Clark, 2010).

A quantitative outcome may be more comprehensive using qualitative data. On researches were qualitative phase is followed by a quantitative phase, the intention

may be to determine better participants or explain mechanisms behind quantitative results, whereas when quantitative phase is followed by qualitative phase, the idea may be to develop an instrument, an intervention or a program informed by qualitative findings.

On the case of this research, the choice for mixed methodology was made base on the depth of the research problem. By using mixed methodology connecting data from a quantitative questionnaire to add to a qualitative stage and finally develop actions with deeper knowledge of the research problem and its aspects. The choice for mixed methodology on this research was made considering both available resources such as time, financial resources but also, the inexistence of any reliable source of data existent to supply the researcher with information about important aspects to be considered for the research question. This data inexistence, plus other available resources, was crucial on the decision for a mixed methodology adoption for this research.

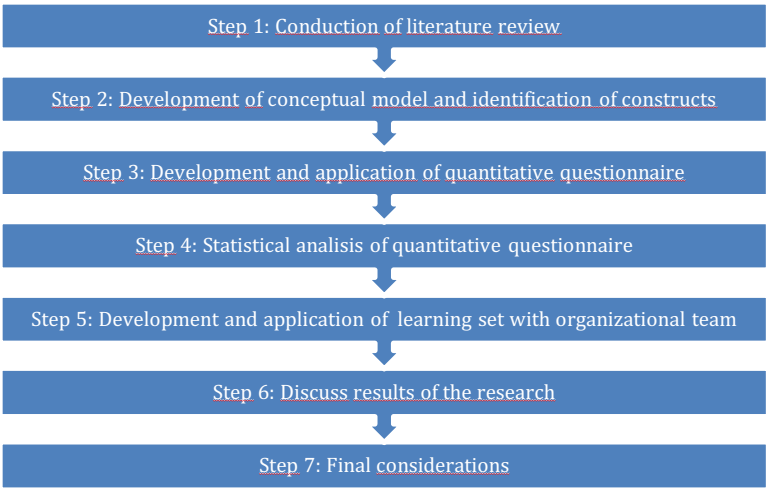
3.4 Research Process

On this study, the researcher aims to identify the constraints that have been delaying the full adoption of renewable energy technologies' products in Brazil, using mixed methodology underpinned by a positivist view connecting data from the quantitative data collection stage to the data collected from the qualitative stage. The research question was developed under a series of previous questionings made by the researcher when looking at the problem to be explored. The adoption of mixed methodology on this action research presents an answer to questions raised by the research which, together, generate the answer to the final research problem.

Answering these questions during the research development was done using the quantitative and qualitative research processes, where the quantitative research process looked focused on answering "what are the constraints that final users see as most influential on their decision making process when buying renewable energy technologies' products?"; the quantitative stage of this research focused on the question "what are the constraints felt by business organizations on the decision making process for adopting renewable energy technologies' products?" and, finally, with the mind set of an action research "what can be done do change this scenario?".

For the development of a study capable of answering these questions, using mixed methodology data collection on an action research, the following research process was adopted.

FIGURE 5: RESEARCH PROCESS DIAGRAM



Source: The author.

The research process will begin with literary review (step 1), which will allow the researcher to obtain knowledge in depth of the subject to be studied, confirming legitimacy, rigour and relevance of the research to be developed and presented. The literature review process is the phase that will help the researcher establish boundaries and focus of the next step, which is the development of conceptual model and identification of constructs (step 2). The development of the conceptual model is the phase of the research where the author will gather the knowledge acquired during the literature review phase and, with focus on the research question and objectives, formulate a research framework grounded on existing theory and identification/exploration of the literary gap to be explored. After the conceptual model is developed, the identification of constructs to be used in the conceptual model is shown. These constructs will provide basis to the questionnaire to be developed, considering that they consist of a set of questions already tested and validated aiming the measurement of these constructs what are each part of the conceptual model applied and will guide the data collection with a scientific rigour.

The next step is the development and application of the questionnaire (step 3), which is the application of the constructs structures gathered on step 2 on the testing population defined, exploring the research question established in the beginning of the

research process. The next stage is step 4, where the statistical analysis of the results found in the previous step will be conducted to refute or corroborate hypothesis made in the conceptual model stage and will provide material for the next phase. After these two phases, the author will move to step 5, which consists on the development and application of the learning sets with the organizational team. During this stage a learning set will be conducted to and organization's team, which will test the information gathered in the quantitative questionnaire application and the researcher will analyse how this information will affect/influence the organizational team. The next stage is step 6 where the researcher will discuss all the data and results collected, how this research has changed the organizational team that participated in the learning set. Finally, the author will arrive at step 7 of final considerations, where the author will point final considerations of the study, limitations, new research gaps that this study has generated and conclusion.

3.5 Descriptive Statistics

This action research was developed under aspects of data collection subject to the authors available resources and the research's philosophy and aims.

On the quantitative stage of this research, the data was collected from a questionnaire applied online in a sample of 132 Brazilian citizens living in the south and southeast of Brazil, whose incomes were at least 9 minimum wages, and who have a graduation degree. These characteristics of the sample were selected to focus on a population living in the most technological advanced areas of Brazil, with a high economic power, economically active and with a level of knowledge that can influence decisions regarding the usage of renewable energy technologies in Brazil faster than other people can. The questionnaires were sent by email with an invitation to participate in the research and the rate of return expected was of was of 10%.

The researcher believes that this is due to two main factors, first factor is that it was not offered any kind of compensation to participate in the research, leaving the participants only with their good will to spend their time or not for this research. Secondly, the researcher noticed that there were many respondents that started the questionnaire but did not finish it, which is a very large evidence the questionnaire, consisting of 87 questions, was too large and demotivating for the participants. Despite the difficulties the questionnaire was applied with success.

The analysis of the data gathered will be presented using the tools of factor analysis, for the reduction of unnecessary factors; multiple regression and multicollinearity test to test the connection between the remaining factors with each other. This statistical analysis will generate a result for the developed conceptual model, where it presents reliable data regarding the relevance and connection of the factors, providing the research with the factors, as per quantitative research, that delay the adoption of renewable energy technologies' products felt by final users under the scenario and population explored.

The gathering of the qualitative data was made by adoption of the learning set tool, which provided a suitable environment for discussions and reflections focused on the research problem and on creating action. The team that participated on this stage was a team of managers of an organization focused on electrical transmission and distribution products. On this stage, the conceptual model developed was discussed with this team composed by managers of the sales/marketing department looking to understand and test the elements of user-intention attitude and environmental attitude on the actual use of renewable energy technology products. The organization selected for this research is a major organization on its field in the Brazilian territory, with a vast experience and understanding of the Brazilian market. Also, this organization has allowed the researcher full access to information and to its managers, providing time for the learning sets and allowing managers the possibility to apply the discussed elements on the learning sets in their sales strategy, to return with reliable data to be discussed and to generate new ideas for the improvement of the acceptance of renewable energy technologies' products in the market. The learning set tool applied on this research has provided an important reflective process that has generated organizational action, where not only the team of the participant managers but also their respective teams have engaged on the application of the organization action defined on the learning sets sections. Many changes were seen on the organization, as it will be explored on the next sections, and these organizational actions are providing new guidelines on how the organization is exploring the renewable energy technologies' market, the definition of an organizational action regarding a different strategy consists on major organizational learning and change.

The result is a connection of quantitative and qualitative data collected for the generation of actions that can tackle the spotted issues precisely and change the current scenario regarding adoption of renewable energy technologies' products. By

bringing the final costumer perception to the organizations, this research built a communication bridge among the two ends, allowing the organizations to better understand the current scenario and develop business strategies built on the information presented to generate positive results.

3.6 Conclusion

This is a problem-based research using mixed methodology by a quantitative data collection process with questionnaire application followed by action research process applying the data collected in an organization focusing the development of actionable knowledge that will help enhancing renewable energy technologies on the Brazilian market.

Statistical analysis conducted by the tools of factor analysis and multiple regression will be used to prove or discard the constructs developed; followed by the field testing provided by the learning sets.

The action research process in this research is constituted by learning sets, which is the main tool to allow application of data collected, analysis and discussions of the results and development of new ideas, thus, allowing the researcher and the organizational team to identify the elements that have been retaining renewable energy technologies' acceptance process in Brazil, and develop action plans that can help solving the research problem.

Chapter 4: Research Framework and Analysis

This chapter presents the development, presentation, statistical testing and final research framework of this research. The hypothesis, considering the theory of Planned Behaviour (TBP), Theory of Reasoned Action (TRA) as the theoretical basis and TAM as core attitudinal model, as per reviewed in the Literature Review chapter, will be presented, resulting in the initial conceptual model of this research. Next there will be the testing phase of this conceptual model through statistical analysis resulting in a final conceptual model of the research which will be provide basis for the learning set chapter, analysis, discussion and final conclusions of this research.

4.1 TPB, TRA and TAM as basis for the Conceptual Model

It was evidenced during the literature review that TAM model based on the Theory of Planned Behaviour (TPB) and Theory of Reasoned Action (TRA) is a widely-used model on the measurement of User-Intention Perspective. This is because TAM is a model considered easier to understand, stable over time and parsimonious when thinking about other User-Intention Perspective measurement models. Given the already mentioned limitations of TRA and TPB, TAM is widely accepted in researches focused on intention of technological application by the user (Davis, 1989; Taylor and Todd, 1995a).

As already discussed in the literature review chapter, as theoretical basis of TAM, TRA implies that social behaviour is guided by both attitude and behaviour. The TAM model also uses other variables, which are Perceived Usefulness and Perceived Ease of Use to predict intention and behaviour. For the theoretical foundation of this research, other variables had to be considered when analysing attitude towards use and behaviour towards renewable energy technologies, once attitude may also be influenced by knowledge of environmental issues of the measured population. These are Perceived Consumer Effectiveness, Environmental Perceived Knowledge, Environmental Concern and Environmental Attitude (Roberts 1996; Dunlap and Van Liere 1978; Bohlen et al. 1993).

Following the discussion of the hypothesis hereunder.

4.1.1 Personal Norm

Usage of renewable energy technologies can be considered a pro-environmental behaviour by promoting benefits to the environment, such as reduction on the emission of carbon in the atmosphere, pollution reduction, and more efficient usage of available natural resources.

Per Cialdini and Trost (1998) norm can be defined as standards or rules that are recognized by group members as guidance for social behaviour, such norms can be differed into norms to the actions of people, known as descriptive norm, or norms of the actions that people should or would do, known as injunctive norm (Cialdini et. al., 1990). In this research the author seeks to understand personal norm in environmental behaviour, therefore per Vaske et.al. (2015) one must first understand that norms are taken into place when proper conditions are met, which are the understanding of the consequences of a behaviour to the environment or to others and secondly acceptance of responsibility for one's actions.

In this sense, to fill the research gap presented, based on the work of Zhang et. al. (2013) the researcher has added the hypothesis of Personal Norm positively influencing Perceived Usefulness on the understanding that the habit of using renewable energy technology on daily basis is influenced by an awareness of consequences for the environment and people in the society.

Hypothesis 1: Personal Norm is positively related to Perceived Usefulness.

FIGURE 6: HYPOTHESIS 1

Source: The author.

4.1.2 Image

Image is an important motivator for adopting different habits in a society. People with knowledge possess the power amongst others by showing their expertise value (Ba et. al. 2001) which leads to earning respect and improving of personal image in a

society (Constant et.al., 1996). People understand the sharing of knowledge contributes to the improvement of personal image (Hall, 2001), thus the improvement of prestige in the society.

Therefore, the improvement of image and reputation can be of great importance for users, leading to the suggestion that the desire of building a good image in a society has a positive influence in perceived usefulness of renewable energy technologies, leading to the hypothesis 2 of this study.

Hypothesis 2: Image is positively related to Perceived Usefulness.

FIGURE 7: HYPOTHESIS 2

Source: The author.

4.1.3 Enjoyment

In this context, the author considers enjoyment as a motivator for individual behaviour by driving users to increase satisfaction and fulfilment by enhancing on usage of renewable energy technologies. Enjoyment is an altruist behaviour considering that helping others without expecting return (Krebs, 1975) can increase the level of enjoyment, satisfaction and motivation. (Ba et.al., 2001).

Considering both positive effects of enjoyment, the author proposes that enjoyment has a positive effect on perceived usefulness.

Hypothesis 3: Enjoyment is positively related to Perceived Usefulness.

FIGURE 8: HYPOTHESIS 3

Source: The author.

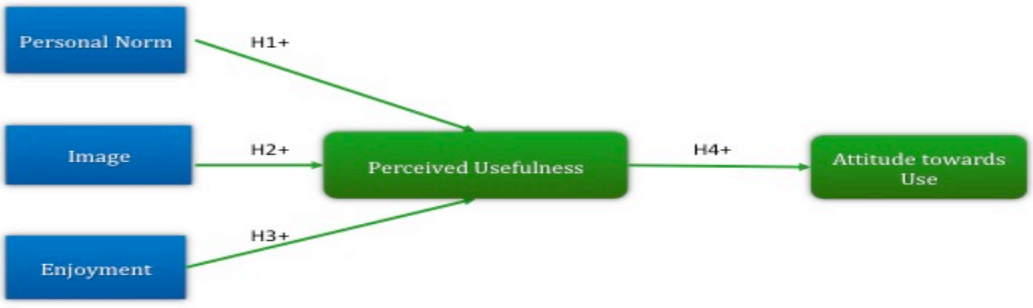
4.1.4 Perceived Usefulness

The concept of perceived usefulness here is based on the work of Davis (1985) and his studies that have proved the importance of perceived usefulness for behaviour prediction. Schultz and Slevin (1975) found through their studies the ability of perceived usefulness can predict decisions of people, work that was later improved by Bandura (1982), who highlighted the importance of perceived usefulness for behaviour prediction by defining it as judgement, meaning the extent that a behaviour well performed is connected to valued outcomes. Finally, perceived usefulness can be defined as an individual's belief that adopting one behaviour can improve his or her personal or professional life.

Considering the definitions presented above, and the hypothesis 1, 2 and 3 already discussed, the author proposes that perceived usefulness, formed by Personal Norm, Image and Enjoyment, has a positive effect on attitude towards use.

Hypothesis 4: Perceived Usefulness is positively related to Attitude Towards Use.

FIGURE 9: HYPOTHESIS 4



Source: The author.

4.1.5 Perceived Consumer Effectiveness

The variable perceived consumer effectiveness consists on measuring the ability of the consumer to judge how their behaviour can affect environmental resource issues (Antil, 1978). The result of this variable in a research can be affected by the consumer's environmental knowledge, (Kinnear et al, 1974) has discovered that when consumers understand the individual power on changing environmental issues, these increase their environmental concern level. When consumers have large perceived consumer effectiveness level, they tend to have more responsible attitude towards the environment (Tucker, 1978; Henion, 1976) which would lead to a change on their purchasing habits into social and environmental products, thus increasing the acceptance level of efforts required for this technology use. This environmental knowledge and purchasing habits can be influenced by information spreading through media.

Once the consumers understand the importance of using renewable energy technologies and understand how it may affect their work and personal lives positively, being easy to use and reducing mental and physical efforts, a change in the behaviour may be executed.

Taking these into consideration, the author proposes that that perceived consumer effectiveness is positively related to perceived ease of use.

Hypothesis 5: Perceived Consumer Effectiveness is positively related to Perceived Ease of Use.

FIGURE 10: HYPOTHESIS 5

Source: The author.

4.1.6 Perceived Ease of Use

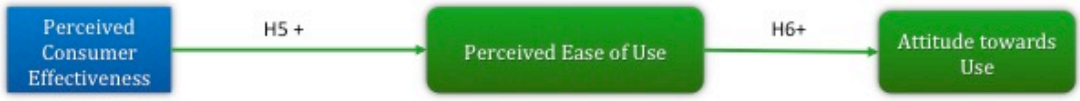
The variable perceived ease of use is also based on the work of Davis (1985) to behaviour prediction. In the study of Tornatzky and Klein's (1982) they have analysed what are the factors of innovation adoption, and found that innovations' complexity plays a main role on the acceptance and usage of new technologies.

Perceived ease of use can also be defined as how well can a person deal with situations using a specific tool (Bandura, 1982).

Following this line, Davis (1985) understands that perceived ease of use refers to the amount of effort required to use a presented tool, in this case, renewable energy technologies, or the balance between the user's understanding that applying such technologies will reduce the amount of physical and mental work. Therefore, the author presents the next hypothesis based on the hypothesis 5 that relates to the personal understanding of how behaviour can change by understanding the benefits of new behaviour. It links perceived consumer effectiveness to perceived ease of use, and now the author proposes that, followed by understanding, the user should feel that the amount of effort to adopt a new technology is reduced, concluding that perceived ease of use is positively related to attitude towards use.

Hypothesis 6: Perceived Ease of Use is positively related to Attitude Towards Use.

FIGURE 11: HYPOTHESIS 6



Source: The author.

4.1.7 Environmental Perceived Knowledge

There are many factors to be analysed on the behavioural prediction regarding ecology. Per Bohen et al (1993) states that for individuals to be considered "green" it is necessary to understand consequences of behaviour. Following Foxall (1984) only attitudinal analysis may not proportionate environmental behaviour prediction consider the inaccuracy of attitude-behaviour.

Bohen et al (1993) understand that knowledge about environmental issues is a key aspect to be considered when accessing greenness level of a certain population.
In this sense Bohen et al (1993) have presented a scale to determine perceived knowledge of various environmental issues, such scale was adopted by the author as basis for the variable environmental concern, which soon will be discussed.

Hypothesis 7: Environmental Perceived Knowledge is positively related to Environmental Concern.

FIGURE 12: HYPOTHESIS 7

Source: The author.

4.1.8 Environmental Concern

Environmental concern is a concept that is linked to ecologically conscious consumer behaviour (ECCB) (Roberts, 1996) (Antil, 1984) which leads to an understanding that a consumer that tends to choose ecological products has a higher level of environmental concern and knowledge, per Lepisto (1974), people with ecological concern will tend to be more altruistic.
Considering these the author presents the hypothesis 8 which consists on environmental concern being positively related to environmental attitude, understanding that the higher the level of ecological concern, the more the individual will tend to an altruist behaviour and be more attracted to perform environmental attitudes.

Hypothesis 8: Environmental Concern is positively related to Environmental Attitude.

FIGURE 13: HYPOTHESIS 8

Source: The author.

4.1.9 Environmental Attitude

The concept of attitude is based on values, beliefs and the effect of those to an object. In this case, environmental attitude, the object is environment, which, per Heberlein (2012) is a large object being hard to define its extent.

Considering the need to better positioning the research into what context of environmental attitude it refers, the author has considered the work of Bohen (1993) which is based his analysis of environmental attitude on the work of Dunlap and Van Liere (1978) which have developed the NEP scale (New Environmental Paradigm). The NEP scale is widely used and its validity has already been proved.

For this research the author understands that the variable environmental attitude is composed by the variable environmental concern, and it will lead to the variable attitude towards use with the same relevance as perceived usage and perceived ease of use. It is an addition to TAM model to analyse the usage of renewable energy technologies not only by its easiness of use and its benefits for personal and/or professional life of the user, but also by to the personal beliefs and values towards the environmental that the final user has.

Hypothesis 9: Environmental Attitude is positively related to Attitude Towards Use.

FIGURE 14: HYPOTHESIS 9

Source: The author.

4.1.10 Attitude Towards Use

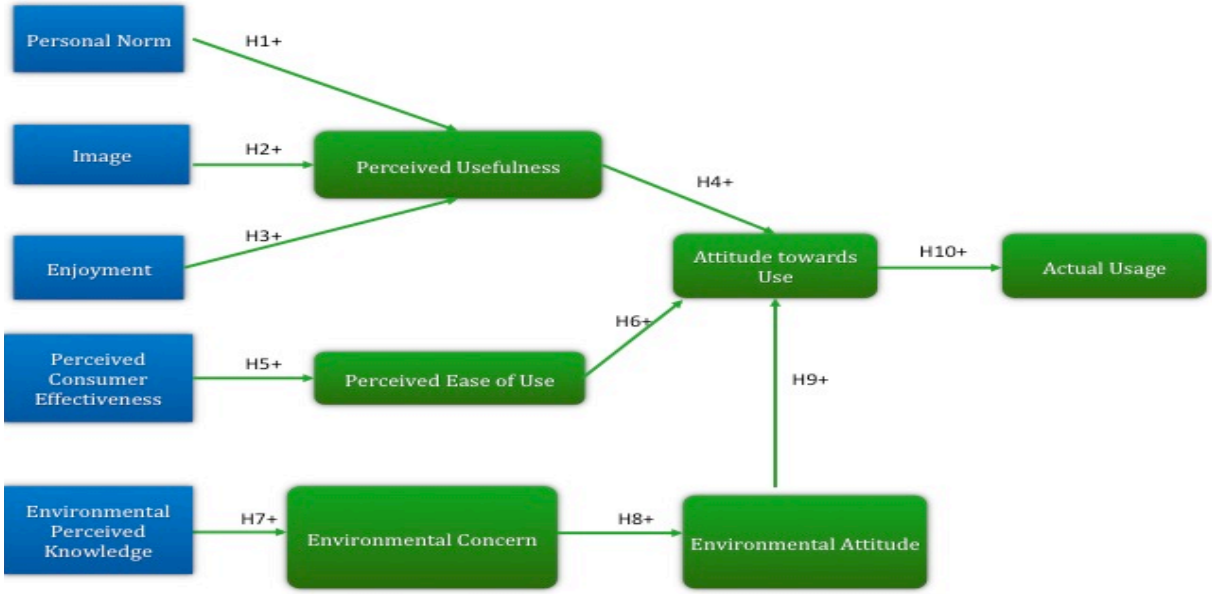
Attitude towards use is defined as the user evaluation of performing a behaviour (Ajzen and Fishbein, 1980). In TAM model (Davis, 1989) the individual's evaluation is composed by perceived usefulness and perceived ease of use. Therefore, if the individual understands that a technology is ease to use and brings benefits to the user, so the Attitude Towards Use should be positive, leading to acceptance behaviour.

In this research, following Petty et al (1997) formation attitude can be affected by many individual and contextual variables, therefore the researcher has added as measurement of attitude the variable Environmental Attitude, which will help on the formation of the Attitude the researcher wishes to explore.

Attitude towards use should lead to certain behaviour, the idea in TAM (Davis, 1989) is that if attitude is positive than behaviour is positive, to test this information the next hypothesis is attitude towards use is positively related to actual usage.

Hypothesis 10: Attitude Towards Use is positively related to Actual Usage.

FIGURE 15: HYPOTHESIS 10



Source: The author.

4.3 Factor Analysis

Factor analysis is a data reduction technique (Pallant, 2010) by looking at the data and finding a way to reduce it into smaller factors analysing the intercorrelation groups existent in the data. It can be exploratory or confirmatory. Exploratory factor analysis is used in early stages of a research to explore the interrelationships about a set of variables. As for confirmatory factor analysis, it is used to confirm hypothesis with an established set of data. Factor analysis is divided into principal component analysis (PCA) and factor analysis (FA). Per Stevens (1996) for PCA is psychometrically simpler and avoids problems of factor indeterminacy that can happen on FA. For that reason, in this research it will be conducted a PCA, the research is looking for a simpler solution, an empirical summary that will allow reliable data reduction.

The first step adopted for the PCA following (Pallant, 2010) was to analyse the correlation in the correlation matrix of the factors, which will be considered intercorrelated only factors with values higher than .5. Next, to measure the strength of the intercorrelation among the factors the recommendation of Tabachnick & Fidell (2007) of a value in the correlation matrix of .3 for an appropriate factor analysis will be followed and a value of .5 for the intercorrelation to be considered. The factorability of the data will be analysed using Bartlett's test of sphericity (Bartlett, 1954) and

Kaiser-Meyer-Olkin (KMO) to measure sampling adequacy (Kaiser, 1970, 1974). Still following Tabachnick & Fidell (2007) for Bartlet's test the data will be considered from a measure <.05 and for the KMO test the minimum value considered will be .6 for a good factor analysis.

Next step to be followed is the Eigen Value analysis, and still following Pallant (2010), only components with Eigen Values >1. will be considered. These components will be selected by the Communalities Table and the factors that have the higher extraction values. Finally, Cronbach Alpha value to measure the level of the reliability of the variable will be considered for values >.5 following Pallant (2010) and the consideration that reliability of a variable is very sensitive of the number of items of the scale.

4.3.1 Personal Norm

The questions for this first variable of the conceptual model were based on the paper of Zhang et al (2013) which has used TAM model to measure the determinants and implications for employees in China to change their user habits for energy saving. All the questions applied on this section of the research followed a 7-point Linkert scale ranging from 1 “strongly disagree” to 7 “strongly agree”.

This variable consists on the following questions:

Table 4: Questions for Personal Norm

Questions for Personal Norm
Personal Norm
Q9 - It would be against my moral principles not to use renewable energy technologies in my environment.
Q10 - Not using renewable energy technologies in my environment would go against my principles.
Q11 - I have a moral obligation to use renewable energy technologies in my environment.
Q12 - I would feel guilty about not using renewable energy technologies in my environment.
Q13 - I feel obliged to use renewable energy technologies in my environment.

Source: The author.

Table 5: Factor Analysis of Personal Norm

Personal Norm	Factor 1	Factor 2
Q12	**.902**	.243
Q13	**.877**	.156
Q11	**.869**	.227
Q09	.155	**.891**
Q10	.260	**.850**
Mean	**.883**	**.870**
Eigenvalue	3.033	1.049
Percent of Variance Explained	60.652%	20.976%
Cumulative Percent of Variance Explained	60.652%	81.628%
KMO	.759	
Bartlett's Test of Sphericity	.000	
Cronbach Alpha	.818	

Source: The author.

The questions for the variable Personal Norm have presented a KMO of .759, which confirms the correlation level among the questions. It also presents a Bartlett's test of Sphericity with significance .000, confirming that factor analysis, for these questions, is appropriate.

For the variable reduction, we are looking for Eigen Values higher than 1., in this case we have 2 components with Eigen Values 3.033 and 1.049 respectively, therefore we will not consider the other components and use these only two which represent 81.628% of the whole variable. To choose the components to be considered we will look at the Factor Loadings and will see the mean values in the extraction table for each factor, which are .883 for factor 1 that consists of Q12, Q13 and Q11. These questions explore personal feelings considering the usage of renewable energy technologies; hence this factor will be labelled Feelings. For factor 2, that consists of Q09 and Q10, both these questions are consistent with morality issues regarding the usage of renewable energy technologies, thus this factor will be called Morality and their mean value is .870, finalizing with two factors that will remain for this variable. Finally, the variable presents a Cronbach Alpha coefficient value of .818 confirming its high level of reliability. All these have been demonstrated on the Table 5.

4.3.2 Image

Based on the work of Kankanhalli et. al. (2005) this variable also has the questions used in the application of one of the many variations of TAM model. As in the previous variable, the questions were applied using a 7-point Linkert scale ranging from 1 “strongly disagree” to 7 “strongly agree”.

This variable consists on the following questions:

Table 6: Questions for Image

Questions for Image
Image
Q14 - Using renewable energy technologies improves my image with my social environment.
Q15 - People in my social environment who use renewable energy technologies have more prestige than those who do not.
Q16 - Using renewable energy technologies in my social environment improves others recognition of me.
Q17 - When I use renewable energy technologies, the people of my social environment respect me.
Q18 - When I use renewable energy technologies my superiors praise me.

Source: The author.

Table 7: Factor Analysis of Image

Image	**Factor 1**
Q16	**.910**
Q15	**.886**
Q17	**.860**
Q18	**.818**
Q14	**.773**
Mean	**.850**
Eigenvalue	3.618
Percent of Variance Explained	72.370%
Cumulative Percent of Variance Explained	72.370%
KMO	.825

Bartlett's Test of Sphericity	.000
Cronbach Alpha	.904

Source: The author.

Regarding the KMO test and Bartlett's test, this variable presented a KMO of .825, confirming correlation among factors, and Bartlett's .000 confirming that factor analysis is appropriate for these questions.

For the factors reduction, one factor scored Eigen value higher than 1., and per the factor loadings table the mean of the questions to be extracted consists on the value of .850 for Q16, Q15, Q17, Q18 and Q14, considering that all the questions will be in this factor, its name will remain Image for conceptual model purposes. Finally, Cronbach Alpha .904 concluding high reliability of the variable per Table 7.

4.3.3 Enjoyment

Still based on the work of Kankanhalli et. al. (2005) which uses TAM model to investigate the contribution of electronic knowledge probability in organizations, the variable enjoyment has used questions based on TAM model and these were applied using a 7-point Linkert scale ranging from 1 “strongly disagree” to 7 “strongly agree”. This variable consists on the following questions:

Table 8: Questions for Enjoyment

Questions for Enjoyment
Enjoyment
Q19 - I enjoy using renewable energy technologies in my environment.
Q20 - I enjoy helping others by using renewable energy technologies.
Q21 - It feels good to use renewable energy technologies in my environment.
Q22 - Using renewable energy technologies in my environment gives me pleasure.

Source: The author.

Table 9: Factor Analysis of Enjoyment

Enjoyment	**Factor 1**
Q19	**.940**
Q21	**.931**
Q20	**.906**
Q22	**.899**

Mean	**.919**
Eigenvalue	3.381
Percent of Variance Explained	84.518%
Cumulative Percent of Variance Explained	84.518%
KMO	.827
Bartlett's Test of Sphericity	.000
Cronbach Alpha	.938

Source: The author

Confirming the correlation matrix, the result of the KMO test is .827 as presented on the tables following, confirming the correlation among the factors. Bartlett's test is .000 confirming application of factor analysis for these factors. Cronbach Alpha of .938, which confirms the significance of the variable for the research and reliability of the variable.

It is possible to see in the upcoming tables Eigen value of 3.381, which is the only value in the Eigen test higher than 1, therefore one factor will be extracted from the variable. Considering this, a mean value from all the questions has been taken with the result of .919 and the factor will be labelled enjoyment considering the content of the questions in place per table 9.

4.3.4 Perceived Usefulness

The factors of this variable were based on the work of Chuttur (2009) which consisted of a review of the TAM model, debating from its origins, its many variations and probabilities of next variations and developments for TAM. The variable perceived usefulness consisted on this work of 6 questions mapped using 7-point Linkert scale ranging from 1 “strongly disagree” to 7 “strongly agree”.

This variable consists on the following questions:

Table 10: Questions for Perceived Usefulness

Questions for Perceived Usefulness
Perceived Usefulness
Q23 - Using renewable energy technologies in my job would enable me to accomplish tasks more quickly.

Q24 - Using renewable energy technologies would improve my job performance.
Q25 - Using renewable energy technologies would increase my productivity.
Q26 - Using renewable energy technologies would enhance my effectiveness on the job.
Q27 - Using renewable energy technologies would make it easier to do my job.
Q28 - I would find renewable energy technologies useful in my job.

Source: The author.

Table 11: Factor Analysis of Perceived Usefulness

Perceived Usefulness	**Factor 1**
Q24	**.976**
Q27	**.971**
Q25	**.967**
Q26	**.952**
Q23	**.944**
Q28	**.765**
Mean	**.929**
Eigenvalue	5.214
Percent of Variance Explained	86.892%
Cumulative Percent of Variance Explained	86.892%
KMO	.928
Bartlett's Test of Sphericity	.000
Cronbach Alpha	.969

Source: The author.

The correlation matrix of this variable registered no values lower than .5, therefore all questions of the variable are interrelated.

The result for the KMO test is .928 and Bartlett's test .000, therefore confirming the relevance of the factors and their possibility of factor analysis application.

The Eigen value test result of 5.214 for only one component and factors table showing the mean of the factors as .929. Considering that all the questions are in the same factor, it will remain labelled Perceived Usefulness.

Cronbach Alpha test result of .969, confirming the reliability of the variable for the research.

4.3.5 Perceived Consumer Effectiveness

Moving to the next variable tested, perceived consumer effectiveness was based on the work of Roberts (1996) which consisted on the development of the Ecologically Conscious Consumer Behaviour (ECCB) model. This research aimed to develop a model that would measure the level of ecological behaviour of consumers and how these would affect their consuming decisions. The variable perceived consumer effectiveness consists of four questions mapped using 7-point Linkert scale ranging from 1 “strongly disagree” to 7 “strongly agree”.
This variable consists on the following questions:

Table 12: Questions for Perceived Consumer Effectiveness

Questions for Perceived Consumer Effectiveness
Perceived Consumer Effectiveness
Q29 - It is worthless for the individual consumer to do anything about pollution.
Q30 - When I buy products, I try to consider how my use of them will affect the environment and other consumers.
Q31 - Since one person cannot have any effect upon pollution and natural resource problems, it doesn’t make any difference what I do.
Q32 - Each consumer’s behaviour can have a positive effect on society by purchasing products sold by socially responsible companies.

Source: The author.

It is possible to see the KMO test scored .553 whereas the minimum considered for relevance of the variable is .5 and in Bartlett's test scored significance of .000. Eigen value test scored 2 components higher than 1, which, per factors table, correspond to the means .839 for factor 1 and .781 for factor 2.

Table 13: Factor Analysis of Perceived Consumer Effectiveness

Perceived Consumer Effectiveness	**Factor 1**	**Factor 2**
Q29	**.895**	
Q31	**.784**	-.325
Q30		**.840**
Q32	-.212	**.722**
Mean	**.839**	**.781**
Eigenvalue	1.718	1.082

Percent of Variance Explained	42.941%	27.048%
Cumulative Percent of Variance Explained	42.941%	69.989%
KMO	.553	
Bartlett's Test of Sphericity	.000	
Cronbach Alpha	.079	

Source: The author.

Following the results presented on the previous tables and the statistical concepts that are being used, the variable Perceived Consumer Effectiveness is neither reliable nor relevant to this research, therefore it will be removed from the next statistical analysis.

4.3.6 Perceived Ease of Use

The questions for the varia3.3.ble perceived ease of use were also based on the work of Chuttur (2009) and its review of the many variations of TAM and considerations of them. The variable perceived ease of use is composed by 6 questions mapped using 7-point Linkert scale ranging from 1 “strongly disagree” to 7 “strongly agree”.
This variable consists on the following questions:

Table 14: Questions for Perceived Ease of Use

Questions for Perceived Ease of Use
Perceived Ease of Use
Q33 - Learning to operate renewable energy technologies is easy for me.
Q34 - I would find it easy to get renewable energy technologies to do what I want to do.
Q35 - My interaction with renewable energy technologies is easy to understand.
Q36 - I would find renewable energy technologies flexible to interact with.
Q37 - It would be easy for me to become skilful at using renewable energy technologies.
Q38 - I would find renewable energy technologies easy to use.

Source: The author.

Table 15: Factor Analysis of Perceived Ease of Use

Perceived Ease of Use	**Factor 1**
Q36	**.918**
Q35	**.890**
Q33	**.865**

Q37	**.859**
Q38	**.838**
Q34	**.794**
Mean	**.861**
Eigenvalue	4.454
Percent of Variance Explained	74.232%
Cumulative Percent of Variance Explained	74.232%
KMO	.883
Bartlett's Test of Sphericity	.000
Cronbach Alpha	.929

Source: The author.

The factors presented on this variable are also important, relevant and significant to the variable considering the KMO test result of .883. and Bartlett's test result of .000. For the factor reduction analysis, and only one component presented an Eigen value larger than 1, and per the Factor Loadings table, the mean value for the factor is .861 and considering that all the questions are on this factor only, it will continue labelled Perceived Ease of Use. Finally, Cronbach Alpha of .929 shows a high reliability of the variable. All the results are shown on the table 15.

4.3.7 Environmental Perceived Knowledge

The questions presented for the variable environmental perceived knowledge have basis on the work of Bohlen et al. (1993) considering the need of understanding the level of environmental knowledge in a population. Composed of 11 questions measured using 7-point Linkert scale ranging from 1 "know nothing about" to 7 "know a lot about".

This variable consists on the following questions:

Table 16: Questions for Environmental Perceived Knowledge

Questions for Environmental Perceived Knowledge
Environmental Perceived Knowledge
Q39 - Acid Rain.
Q40 - Sea/River pollution.
Q41 - Air pollution from power stations.

Q42 - Global warming.
Q43 - Ozone layer depletion.
Q44 - Pollution of drinking water.
Q45 - Pollution from pesticides/insecticides.
Q46 - Destruction of the rain forests.
Q47 - Building in unspoilt areas.
Q48 - Radiation from storage of nuclear waste.
Q49 - World population explosion.

Source: The author.

Table 17: Factor Analysis of Environmental Perceived Knowledge

Results for Environmental Perceived Knowledge		
Environmental Perceived Knowledge	Factor 1	Factor 2
Q44	**.897**	.209
Q42	**.877**	.276
Q40	**.846**	.176
Q43	**.837**	.280
Q46	**.810**	.408
Q45	**.695**	.514
Q48	.131	**.877**
Q41	.128	**.711**
Q49	.457	**.700**
Q47	.482	**.695**
Q39	.438	**.544**
Mean	**.827**	**.705**
Eigenvalue	6.752	1.291
Percent of Variance Explained	61.137%	11.733%
Cumulative Percent of Variance Explained	61.137%	72.870%
KMO	.887	
Bartlett's Test of Sphericity	.000	
Cronbach Alpha	.923	

Source: The author.

This variable is considered important, relevant and significant looking at the KMO test result of .883 and Bartlett's significance of .000.

In the factor reduction analysis, Eigen test showed two values higher than 1, which, per the factors table means the first factor consists of the questions Q44, Q42, Q40, Q43, Q46 and Q45 with the mean of .827, this factor will be labelled Pollution and Depletion of Natural Resources considering the questions' content. For the second factor with a mean of .705 formed by the questions Q48, Q41, Q49, Q47 and Q39, it

will be labelled Environmental Consequences considering the question's contents which are based on consequences of depletion of natural resources.
Cronback Alpha of .929 showing high reliability of the variable to the research.
All the test is shown on the table hereunder:

4.3.8 Environmental Concern

The questions used to test Environmental Concern were also based on the work of Roberts (1996). In the development of the ECCB scale, Roberts (1996) has applied the NEP scale (Dunlap and Van Liere, 1978) for mapping of environmental concern on his research, as stated earlier on this paper a highly used and explored model for mapping environmental concern. The questions used were based on the first version of NEP (Dunlap and Van Liere, 1978), as follows:

Table 18: Questions for Environmental Concern

Questions for Environmental Concern
Environmental Concern
Q50 - Plants and animals exist primarily to be used by humans.
Q51 - We are approaching the limit of the number of people the earth can support.
Q52 - To maintain a healthy economy we will have to develop a "steady-state" economy where industrial growth is controlled.
Q53 - The earth is like a spaceship with only limited room and resources.
Q54 - Humans need not adapt to the natural environment because they can remake it to suit their needs.
Q55 - There are limits to growth beyond which our industrialized society cannot expand.
Q56 - The balance of nature is very delicate and easily upset.
Q57 - When humans interfere with nature it often produces disastrous consequences.
Q58 - Humans must live in harmony with nature in order to survive.
Q59 - Mankind is severely abusing the environment.
Q60 - Humans have the right to modify the natural environment to suit their needs.
Q61 - Mankind was created to rule over the rest of nature.

Source: The author.

Table 19: Factor Analysis of Environmental Concern

Results for Environmental Concern			
Environmental Concern	Factor 1	Factor 2	Factor 3
Q59	**.818**	.323	-.121

Q58	**.785**	.223	
Q57	**.752**	.235	-.232
Q56	**.715**	.342	-.189
Q51	**.523**	.420	
Q55	.281	**.806**	
Q53	.318	**.749**	-.151
Q52	.317	**.719**	
Q61	-.243		**.795**
Q60	-.495		**.682**
Q50	.300	-.383	**.672**
Q54	-.104	-.249	**.641**
Mean	**.718**	**.758**	**.697**
Eigenvalue	5.038	1.635	1.210
Percent of Variance Explained	41.981%	13.624%	10.084%
Cumulative Percent of Variance Explained	41.981%	55.605%	65.689%
KMO	.818		
Bartlett's Test of Sphericity	.000		
Cronbach Alpha	.629		

Source: The author.

Looking at KMO test this variable has scored .818 and tooling at Bartlett's test of .000, making these factors both relevant and significant for the measurement of the variable. As for factor reduction, Eigen values >1 are stated for three components of the variable. Per the factors table three factors were considered. Factor 1 with mean of .718 consisting of the questions Q59, Q58, Q57, Q56 and Q51, this factor will be labelled Environmental Balance due to the questions that are based on importance of balance between environment and human society. Factor 2 with a mean of .758 consisting of the questions Q55, Q53 and Q52 which due to its contents that directly refer to the importance of controlled exploitation of the environment, it will be labelled Environmental Exploitation. Factor 3 with a mean of .697 consisting of questions Q61, Q60, Q50 and Q54 labelled Environmental Control, considering that the questions for this factor directly refer to human control over natural resources.

Finally, a Cronbach Alpha of .612 for reliability of this variable was found.

4.3.9 Environmental Attitude

The factors of the variable Environmental Attitude were based on the work of Bohlen, Schlegelmilch, and Diamantopoulos, A. (1993) where the authors worked on the

development of reliable measurements some environmental concepts, such as environmental attitude. The questions applied are as follows:

Table 20: Questions for Environmental Attitude

Questions for Environmental Attitude
Q62 - The environment is one of the most important issues facing society today.
Q63 - We should pay a considerable amount of money to preserve our environment.
Q64 - Strict global measures must be taken immediately to halt environmental decline.
Q65 - A substantial amount of money should be devoted to environmental protection.
Q66 - Unless each of us recognizes the need to protect the environment, future generations will suffer the consequences.
Q67 - The benefits of protecting the environment do not justify the expense involved.
Q68 - The environmental policies of the main political parties are one issue I consider when deciding how to vote.
Q69 - Green issues should not be a main consideration when deciding what we do in the future.
Q70 - Personally, I cannot help to slow down environmental deterioration.
Q71 - The importance of the environment is frequently exaggerated.
Q72 - The benefits of overcoming environmental deterioration are not sufficient to warrant the expense involved.
Q73 - Even if each of us contributed towards environmental protection, the combined effect would be negligible
Q74 - Too much fuss is made about environmental issues.
Q75 - The government should take responsibility for environmental protection.
Q76 - The increasing destruction of the environment is a serious problem.
Q77 - Everyone is personally responsible for protecting the environment in their everyday life.
Q78 - Issues relating to the environment are very important.
Q79 - If all of us, individually, made a contribution to environmental protection, it would have a significant effect.
Q80 - Each of us, as individuals, can make a contribution to environmental protection.
Q81 - Firms should always put profitability before environmental protection.

Source: The author.

Table 21: Factor Analysis of Environmental Attitude

Results for Environmental Attitude				
Environmental Attitude	Factor 1	Factor 2	Factor 3	Factor 4
Q77	**.904**	-.149		
Q78	**.892**	-.199		.115
Q76	**.882**	-.228	.127	.116
Q79	**.823**		.242	-.158
Q66	**.812**	-.269	.111	
Q80	**.796**		.251	-.109
Q64	**.676**	-.361	.299	.158
Q71	-.219	**.787**		
Q72		**.762**	-.376	
Q69	-.134	**.713**	-.214	
Q74	-.217	**.651**		.110
Q81	-.129	**.626**	.104	
Q73	-.263	**.613**	.167	.463
Q67		**.528**	-.375	.180
Q63	.146		**.794**	
Q62	.514	-.250	**.626**	.134
Q68	.418	-.196	**.564**	
Q65	.389	-.397	**.541**	.310
Q70		.313		**.682**
Q75	.511	-.258	-.186	**.561**
Mean	**.826**	**.668**	**.631**	**.621**
Eigenvalue	8.062	2.647	1.555	1.113
Percent of Variance Explained	40.310%	13.235%	7.773%	5.567%
Cumulative Percent of Variance Explained	40.310%	53.545%	61.318%	66.885%
KMO	.883			
Bartlett's Test of Sphericity	.000			
Cronbach Alpha	.660			

Source: The author.

Analysing the KMO test the variable's score is .883 proving its relevance, and in Bartlett's test the variable scored.000 of significance, which is a high level. Looking at Eigen values test, 4 factors scored >1, therefore only 4 factors will be extracted for further analysis. Factor 1, labelled Personal Environmental Attitude with a mean of .826 consisting of the questions Q77, Q78, Q76, Q79, Q66, Q80 and Q64 which

mention the importance of personal attitude to preserve the environment. Factor 2, labelled Understated Environmental Attitude, with a mean of .668 consisting of the questions Q71, Q72, Q69, Q74, Q81, Q73 and Q 67, which have in its contents negative importance of personal attitude towards the environment. Factor 3, labelled Legal/Financial Environmental Attitude, with a mean of .631 consisting of the questions Q63, Q62, Q68 and Q65, which mention the need of legal and financial measures towards the environment. Finally factor 4, labelled Political Environmental Attitude with a mean of .621 consisting of the questions Q70 and Q75, understate the importance of personal involvement and affirms the political responsibility for environmental issues. At last, Cronbach Alpha scored .660 for reliability of the variable.

4.3.10 Attitude Towards Use

In the variable Attitude Towards Use, the factors used for its measurement were extracted from the work of Allam et. al (2012) which has used the questions for actual usage for measuring the creation and sharing of tags in social media. The author has based his questionnaire on one of the many variations of TAM model. The questions that based are as follows:

Table 22: Questions for Attitude Towards Use

Questions for Attitude Towards Use
Q82 - Adopting renewable energy technologies is beneficial to me.
Q83 - Adopting renewable energy technologies is desirable to me.
Q84 - Adopting renewable energy technologies is favourable to me.
Q85 - Adopting renewable energy technologies is a good idea.

Source: The author.

Table 23: Factor Analysis of Attitude Towards Use

Results for Attitude Towards Use	
Attitude Towards Use	Factor 1
Q83	**.962**
Q82	**.955**
Q84	**.920**
Q85	**.918**
Mean	**.939**
Eigenvalue	3.526

Percent of Variance Explained	88.138%
Cumulative Percent of Variance Explained	88.138%
KMO	.823
Bartlett's Test of Sphericity	.000
Cronbach Alpha	.954

Source: The author

For the KMO test the variable scored .823 confirming its high level of relevance, and for Bartlett's test it has scored a significance level of .000 confirming its high level of significance of the variable.

In Eigenvalues test only one component scored >1, therefore only one factor will be extracted for further analysis, which will be labelled Attitude Towards Use consisting of the questions Q83, Q82, Q84 and Q85 with a mean of .939.Finally the variable registered a Cronbach Alpha value of .954 confirming high reliability of the variable to the research.

4.3.11 Actual Use

Based on the work of Averweg (2008) the factors for the variable actual use were adopted in this research. Averweg (2008) based his research on the TAM model to test the usage of information system in organizations. Although it is hard to predict actual usage considering that in between the attitude towards use and actual usage there can be change in the decision, some researches find that measuring Actual Use can help on the understanding of the studied situation. The factors used to test actual usage are as follows:

Table 24: Questions for Actual Use

Factors for Actual Use
Q86 - I currently use renewable energy technologies.
Q87 - Assuming that renewable energy technologies will be available, I predict that I will use renewable energy technologies in the future.

Source: The author.

The KMO test with a result of .500 one can conclude shows a low level of relevance, although in Bartlet's test the significance is high, .000.
Eigenvalues show only one factor with value >1, looking at the factors table both factors have the same extraction value of .819, finally in the Cronbach Alpha test the result found of .457 shows little reliability of the variable.

Table 25: Factor Analysis of Actual Use

Results for Actual Use	
Attitude Towards Use	Factor 1
Q87	**.819**
Q86	**.819**
Eigenvalue	1.341
Percent of Variance Explained	67.063%
Cumulative Percent of Variance Explained	67.063%
KMO	.500
Bartlett's Test of Sphericity	.000
Cronbach Alpha	.457

Source: The author.

Considering the results of the tests, this variable will be excluded from future statistical analysis, being a variable that is neither reliable nor relevant to the research and that with no correlation among its factors.

4.3.12 Factor Analysis Discussion

Considering the length of the research responses, it is important to reduce factors as much as possible, reducing the analysis to factors as intercorrelated as possible.
The factor analysis is conducted for every question that each variable
The tools that were used by the researcher to perform factor analysis were based on the work of Pallant (2010) and are a composition of: intercorrelation of factors valued higher than .5; strength of the factors correlation with values higher than .3; Bartlet's test of sphericity higher than .05; KMO test with a minimum value of .6; Eigen value higher than 1; and Cronbach Alpha higher than .5.

All these items are encountered when performing the factor analysis in the SPSS, the tool used in this research.

On the table hereunder find the results shown from the tests performed by the researcher:

Table 26: Factor Analysis Research

Factors		
Variables	**Factors Names**	**Factor Means**
Personal Norm	Feelings	.883
	Morality	.870
Image	Image	.850
Enjoyment	Enjoyment	.919
Perceived Usefulness	Perceived Usefulness	.929
Perceived Consumer Effectiveness	No factors.	-
Perceived Ease of Use	Perceived Ease of Use	.861
Environmental Perceived Knowledge	Pollution and Depletion of Natural Resources	.827
	Environmental Consequences	.705
Environmental Concern	Environmental Balance	.718
	Environmental Exploitation	.758
	Environmental Control	.697
Environmental Attitude	Personal Environmental Attitude	.826
	Understated Environmental Attitude	
	Legal/Financial Environmental Attitude	.668
	Political Environmental Attitude	.631
		.621
Attitude Towards Use	Attitude Towards Use	.939
Actual Use	No factors.	-

Source: The author.

The table 26 is showing the result in means for the factors analysis. These means are the values that will generate the factors that will go through the multiple regression and multicollinearity test. On each of the tests performed in the statistics chapters, it is also analysed the other tools presented such as KMO, Bartlet's, Eigen value and

Cronbach alfa, for these tools help the researcher understand the intercorrelation of the factors, as well as their validity for the research.

All these considered, the researcher has developed the factors presented on table 26, some variables have turned into more than one factor and will be analysed as such in the regression and multicollinearity, as others have no factors, making these variables not correlated to the others in the conceptual model, turning them no longer valuable to the research, taking them out of the conceptual model.

Considering these affirmations and the results of the factor analysis test, the researcher has developed factors that, some are different from the variable, and others, for lack of factor, were disclosed of the research.

For the variable Personal Norm, the researcher found two relevant means, making important to have 2 factors for this variable. The factors were constituted per the questions in the questionnaire that showed a higher intercorrelation. So, for Personal Norm the factors are Feelings and Morality, these were called so because the questions intercorrelated for these factors approach these certain issues.

Next, for the variable Image resulted in only one mean, therefore it maintained the name Image as a factor with all the questions of the variable.

The variable Enjoyment had the same outcome as the variable Image, with only one mean it turned to be only one factor with the same name Enjoyment, and the same questions from the variable.

In the variable Perceived Usefulness, as expected, it had only one mean on the factor analysis and its factor is the own variable, this is one if the issues why TAM is considered a very reliable testing model. In this case, the multiple regression and multicollinearity tests for Perceived Usefulness will be based in the factors Feelings, Morality, Image and Enjoyment.

Next variable is Perceived Consumer Effectiveness, which tried to measure, by adopting the Ecologically Conscious Consumer Behaviour model, how the consuming results are affected by the level of their ecological behaviour. The applications of the questions developed on this model resulted in two means, but the found value for KMO of .553 and Bartlett's test scored .000, ending with a Cronbach Alpha of .079, which made the variable not reliable or relevant to the research, therefore it was removed and none of the two factors found were used in the next analysis making the variable Perceived Consumer Effectiveness not having and influence on the variable Perceived Ease of Use.

For the variable Perceived Ease of Use, it turned to be quite relevant and reliable in the research, with a KMO of .883, Bartlett's test of .000 and Cronbach Alpha of .929. As it is a widely tested and used variable, Perceived Ease of Use produced only one mean that resulted on the factor Perceived Ease of Use, not being influenced by any other factors.

Following the model is the variable Environmental Perceived Knowledge, this variable was added in the conceptual model with the ideal and a level of perceived knowledge of the environment would the variable Environmental Concern.

Testing Environmental Perceived Knowledge, the researcher found two factors to be considered, which were named Pollution and Depletion of Natural Resources with a mean of .827 and Environmental Consequences with a mean of .705. These factors received these names per what the questions for each factor addressed.

Next variable on the model is the Environmental Concern, it supposedly would be influenced by Environmental Perceived Knowledge. The variable Environmental Concern attempted to measure if the level of Environmental Concern would influence the behaviour of the consumer with regards to Environmental Attitude.

During the Factor Analysis test, the variable environmental concern resulted three factors, Environmental Balance with a mean of .718, Environmental Exploitation with a mean of .758 and Environmental Control with a mean of .697. The names given for these factors followed the content of the questions that formed each factor. The variable was considered relevant and reliable to the research per KMO, Bartlett's and Cronbach Alpha tests.

The next variable to be analysed is Environmental Attitude. This variable was designed to measure the level of Environmental Attitude of users. During the test of this variable, the researcher found four factors, Personal Environmental Attitude with mean of .826, Understated Environmental Attitude with mean of .668, Legal/Financial Environmental Attitude with mean of .631 and Political Environmental Attitude with mean of .621. These factors were named per content of the questions on them. The variable was tested reliable and relevant; therefore, it will be present in the further statistical analysis.

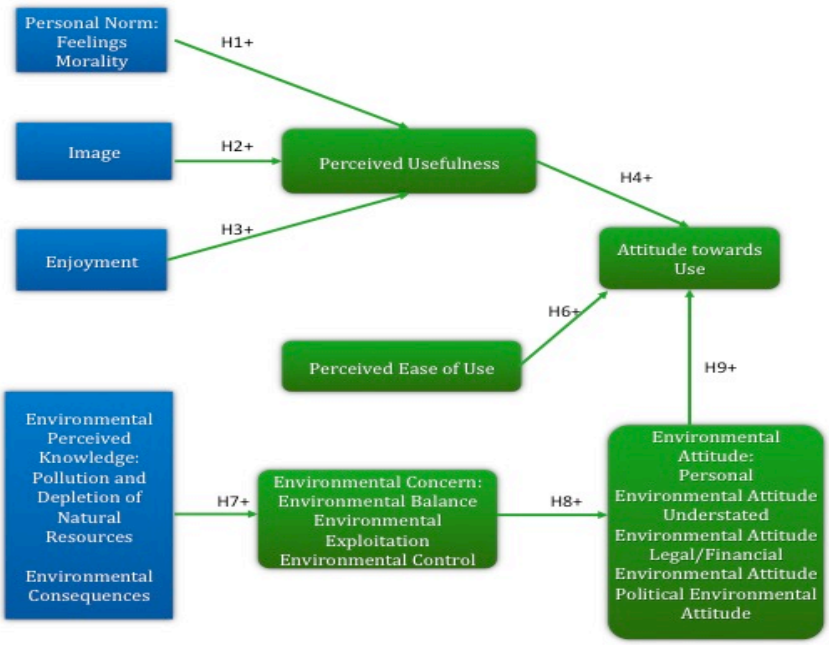
Next variable of analysis is Attitude Towards Use. This variable is present on the TAM model and its formed by Perceived Usefulness, Perceived Ease of use and, for the addition of Environmental Attitude on this paper's conceptual model, Environmental

Attitude. In the factor analysis, this variable was considered reliable and relevant, with a single mean of .939, which results in only one factor for the following analysis.

The final variable that was considered on the factor analysis is the variable Actual Use. This variable was based on the work of Averweg (2008), and during the factor analysis, it was found nor reliable or relevant with values of Cronbach Alpha of .457 and KMO of .500. This variable is considered by many researchers quite difficult to measure based only on Attitude Towards Use (ATU), disregarding the any other variable that might interfere in the gap between the ATU and Actual Use, which might explain, in this case, the non-relevance and reliability for Actual Use in this research's conceptual model.

The result considering the factor analysis is the following conceptual model:

FIGURE 19: CONCEPTUAL MODEL AFTER FACTOR ANALYSIS



Source: The author.

The changes Factor Analysis test have been many. First the loss of two variables, Perceived Consumer Effectiveness and Actual Use, which were considered irrelevant and unreliable to continue in the conceptual model. The loss of Perceived Consumer Effectiveness, which aimed to predict how the consuming results are affected by the level of their ecological behaviour and it was based of Perceived Ease of Use,

following the idea that by understanding how the level of ecological behaviour can affect the consumer habits, therefore providing the hypothesis that ecological behaviour can affect the Perceived Ease of Use of renewable energy technologies. The next variable lost is the Actual Usage, which was based on the hypothesis that Attitude Towards Use can influence Actual Usage of renewable energy technologies, the loss of this variable is understandable by the fact that it disregards any other environmental and personal change in the gap between Attitude Towards Use and Actual Use.

The second major change was the creation of different factors to be analysed, like the split of the variable Personal Norm into the factors Feelings and Morality, split of the variable Environmental Perceived Knowledge into the factors Pollution and Depletion of Natural Resources and Environmental Consequences, split of the variable Environmental Concern into the factors Environmental Balance, Environmental Exploitation and Environmental Control and split of the variable Environmental Attitude into the factors Personal Environmental Attitude, Understated Environmental Attitude, Legal/Financial Environmental Attitude and Political Environmental Attitude. The splitting of these Variable into many different factors is the result of the set of questions and what they focused on the research, making the Factor Analysis very useful for the understanding of the composition of the variables and which factors inside the variables had more or less weight in the final variable result.

Following the statistical analysis, the researcher has conducted a multiple regression and multicollinearity test to understand the relationship between the variable and its factors and from factors to factors, so that the hypothesis arisen can be tested and proved.

4.4 Multiple Regression and Multicollinearity Test

Multiple regression is a statistical technique to find the relationship between a dependent variable and its multiple independent variables. The outcome of a multiple regression will result on an equation that show the weight that the independent variables analysed have on the outcome of the dependent variable (Stevens, 1996).

The multiple regression analysis hereunder will also show t-statistic representing the degree of freedom among the variables, f-statistic values which stands for the significance of the regression performed as in significance of F which is to be

considered significant for values p<.05; R^2 adjusted R^2 which will represent how the data will fit the curve, being R^2 considering all the values of the variables and adjusted R^2 disregarding possible biases and finally a p value which will tell the significance of the relationship among the variables analysed.

The Multicollinearity test stands for testing the relationship among variables. Per Pallant (2010) multicollinearity is detected when there is high correlation among independent variables, which can be considered by r=.9 or higher. Testing for multicollinearity will provide this regression analysis to understand if the independent variables are highly correlated, and if this is the case, measures of removal of highly intercorrelated variables of the model.

The multicollinearity test consists on the analysis of the Pearson Correlation among the variables and followed by collinearity statistics. Still following Pallant (2010) If there is a correlation higher than .7 among the independent variables, tolerance higher lower than .10 and VIF above 10, multicollinearity is diagnosed among these independent variables and measures indicated above should be taken.

4.4.1 H1, H2, H3: Perceived Usefulness, - Feelings, Morality, Image and Enjoyment

On the factor analysis, the variable Personal Norm was divided into two factors, which are Feelings and Morality. This is not an issue for the conducting of this multiple regression test considering that the only variable that resulted in more than one factor is Personal Norm which, in this case, is an independent variable, resulting in the possibility of one multicollinearity test to test H1, H2 and H3.

Table 27: Results for Regression Analysis of Perceived Usefulness

Results for Regression Analysis - Perceived Usefulness (Dependent Variable), Feelings, Morality, Image and Enjoyment				
Parameter	Partial Regression Coefficient *(B)*	Standard Error	Standardized Regression Coefficient *(Beta)*	*t*-statistic
Intercept	-1.862	67.198		-.028
Feelings	.166	2.251	.181	.074

Morality	-.001	3.997	.000	.000
Image	-.018	.875	-.021	-.020
Enjoyment	.853	8.239	.208	.103
F-Statistic	.003			
Significance of F	1.000			
R^2	.012			
Adjusted R^2	-3.942			
***p=1.000**				

Source: The author.

Table 28: Pearson Correlation

Pearson Correlation					
	Perceived Usefulness	Feelings	Morality	Image	Enjoyment
Perceived Usefulness	1.000	.000	-.020	-.014	.055
Feelings	.000	1.000	-.707	.176	-.856
Morality	-.020	-.707	1.000	-.216	.502
Image	-.014	.176	-.216	1.000	-.123
Enjoyment	.055	-.856	.502	-.123	1.000

Source: The author.

Table 29: Collinearity Statistics

Collinearity Statistics		
Model		
	Tolerance	VIF
(Constant)		
Feelings	.164	6.096
Morality	.453	2.208
Image	.952	1.051
Enjoyment	.246	4.069

Source: The author.

Considering table 27 for the results of multiple regression with the dependent variable perceived usefulness and independent variables personal norm, image and enjoyment, it is possible to see that the regression is statistically significant with an F-Statistic of 0.003 and p=1.000, the portion of variance from the dependent variable to

the independent variables is 12% in R^2 and -39.43% in adjusted $R^{2,}$ reducing biases and meaning the low correlation levels within the variables.
Looking at the regression coefficients *(B)* it is possible to see the variations in each factor analysed with regards to the intercept and how the variations of each of these have a final effect on the dependent variable. If considering the standard error predicted in the column we arrive at the standardized regression coefficient *(Beta)* which can be used if one wishes to reduce possible biases and finally the t-statistic representing the likelihood of the parameter achieve zero.
Analysing these it is possible to achieve the following equation:

Perceived Usefulness = Constant + [(β x Feelings) + (β x Morality) + (β x Image) + (β Enjoyment)]

Using the values of table 27 the equation is:

PU = -1.862 + [(.166 x Feelings) + (-.001 x Morality) + (-.018 x Image) + (.853 x Enjoyment)]

The only assumption that is not correlated is Perceived Usefulness and Feelings, considering that these have a Pearson correlation value of 0, all the other assumptions are correlated, negatively or positively, which is confirmed by the tolerance test with no values lower than .10 and VIF values not higher than 10, affirming that there is no multicollinearity, therefore these variables make the linear regression performed reliable and confirms the hypothesis H1, H2 and H3 of positive relation among variables.

4.4.2 H5: Perceived Ease of Use - Perceived Consumer Effectiveness

The next multiple regression per the conceptual model of this research would be Perceived Ease of use as dependent variable and Perceived Consumer Effectiveness as independent variable, but this regression will not be performed considering that no factors on the variable Perceived Consumer Effectiveness were extracted in the factor analysis due to its low Cronbach Alpha value registered, the variable is not reliable for the research, therefore making the H5 null.

4.4.3 H7: Environmental Concern - Environmental Perceived Knowledge

As presented on the factor analysis, the variable Environmental Concern was divided into three factors, which are Environmental Balance, Environmental Exploitation and Environmental Control. Therefore, the analysis will be conducted by each factor from the dependent variable to the factors of the independent variable.

Table 30: Hypothesis 7

Independent Variable	**Environmental Perceived Knowledge**	**Pollution and Depletion of Natural Resources** **Environmental Consequences**
Dependent Variable	**Environmental Concern**	Environmental Balance Environmental Exploitation Environmental Control

Source: The author.

4.4.3.1 Environmental Balance - Pollution and Depletion of Natural Resources, Environmental Consequences

The next regression to be performed regards the relationship between Environmental Balance as a dependent variable, which has been detected in the factor analysis as one of the factors for Environmental Concern; Pollution and Depletion of Natural Resources and Environmental Consequences as independent variables which were detected in the factor analysis as the factors for Environmental Perceived Knowledge.

Table 31: Results for Regression Analysis of Environmental Balance

Results for Regression Analysis - Environmental Balance (Dependent Variable), Pollution and Depletion of Natural Resources and Environmental Consequences.				
Parameter	Partial Regression Coefficient *(B)*	Standard Error	Standardized Regression Coefficient *(Beta)*	*t*-statistic
Intercept	12.487	28.754		.434
Pollution and Depletion of Natural Resources	-.506	4.560	-.076	-.111
Environmental Consequences	-.891	1.237	-.495	-.720

F-Statistic	.377
Significance of F	.714
R^2	.201
Adjusted R^2	-.332
***p<.8**	

Source: The author.

Table 32: Pearson Correlation

Pearson Correlation			
	Environmental Balance	Pollution and Depletion of Natural Resources	Environmental Consequences
Environmental Balance	1.000	-.019	.206
Pollution and Depletion of Natural Resources	-.019	1.000	.350
Environmental Consequences	.206	.350	1.000

Source: The author.

Table 33: Collinearity Statistics

Collinearity Statistics		
Model		
	Tolerance	VIF
Intercept		
Pollution and Depletion of Natural Resources	.564	1.773
Environmental Consequences	.564	1.773

Source: The author.

Per table 31 which presents the results for regression analysis considering environmental balance as the dependent variable and pollution and depletion of natural resources and environmental consequences as independent variables, for the results of multiple regression with the dependent variable, it is possible to confirm

the statistical significance of the regression with the results of F-Statistic of 0.377 and p<.8, the portion of variance from the dependent variable to the independent variables is 20,1% in R^2 and -33.2% in adjusted $R^{2,}$ reducing biases and meaning the low correlation levels within the variables.

Analysing regression coefficients *(B)* it is possible to see that that the variations of each independent variable have on the dependent variable, and these are all negative Analysing (*Beta)* for biases reducing, the values are still negative, confirming the opposite variation that the independent variables have on the dependent variable. Finally, at t-static there are no traces of values close to zero, which is confirmed by the correlation table showing that all variables are correlated.

Analysing these it is possible to achieve the following equation:

Environmental Balance = Constant + [(β x Pollution and Depletion of Natural Resources) + (β x Environmental Consequences)]

Using the values of table 31 the equation is:

EB = 12.487 + [(-.506 x Pollution and Depletion of Natural Resources) + (-.891 x Environmental Consequences)]

In the tolerance test it was not found values lower than .10 and VIF values not higher than 10, affirming that there is no multicollinearity, therefore these variables make the linear regression performed reliable.

4.4.3.2 Environmental Exploitation - Pollution and Depletion of Natural Resources, Environmental Consequences

The following regression was performed regarding the relationship between Environmental Exploitation as a dependent variable, which has been detected in the factor analysis as one of the factors for Environmental Concern, Pollution and Depletion of Natural Resources and Environmental Consequences as independent variables, which were detected in the factor analysis as the factors for Environmental Perceived Knowledge.

Table 34: Results of Regression Analysis for Environmental Exploitation

Results for Regression Analysis - Environmental Exploitation (Dependent Variable), Pollution and Depletion of Natural Resources and Environmental Consequences.				
Parameter	Partial Regression Coefficient *(B)*	Standard Error	Standardized Regression Coefficient *(Beta)*	*t*-statistic
Intercept	12.288	9.181		1.338
Pollution and Depletion of Natural Resources	-1.071	1.456	-.512	-.736
Environmental Consequences	-.294	.395	-.518	-.743
F-Statistic	.329			
Significance of F	.742			
R^2	.180			
Adjusted R^2	-.367			
***p<.8**				

Source: The author.

Table 35: Pearson Correlation

Pearson Correlation			
	Environmental Exploitation	Pollution and Depletion of Natural Resources	Environmental Consequences
Environmental Exploitation	1.000	-.170	-.179
Pollution and Depletion of Natural Resources	-.170	1.000	-.660
Environmental Consequences	-.179	-.660	1.000

Source: The author.

Table 36: Collinearity Statistics

Collinearity Statistics		
Model		
	Tolerance	VIF
Intercept		
Pollution and Depletion of Natural Resources	.564	1.773
Environmental Consequences	.564	1.773

Source: The author.

Following table 34 which presents the results for regression analysis considering environmental exploitation as the dependent variable and pollution and depletion of natural resources and environmental consequences as independent variables, it is possible to confirm the statistical significance of the regression with the results of F-Statistic of 0.329 and p<.8, the portion of variance from the dependent variable to the independent variables is 18% in R^2 and -36.7% in adjusted $R^{2,}$ reducing biases and meaning the low correlation levels within the variables.

Analysing regression coefficients *(B)* it is possible to see that that the variations of each independent variable have on the dependent variable, and these are all negative. As for analysis of *(Beta)* for biases reducing, the values are still negative, confirming the opposite variation that the independent variables have on the dependent variable. Finally, at t-static there are no traces of values close to zero, which is confirmed by the correlation table showing that all variables are correlated.

Analysing these it is possible to achieve the following equation:

Environmental Exploitation = Constant + [(β x Pollution and Depletion of Natural Resources) + (β x Environmental Consequences)]

Using the values of table 34 the equation is:

EE = 12.288 + [(-1.071 x Pollution and Depletion of Natural Resources) + (-.294 x Environmental Consequences)]

In the tolerance test it was not found values lower than .10 and VIF values not higher than 10, affirming that there is no multicollinearity, therefore these variables make the linear regression performed reliable.

4.4.3.3 Environmental Control - Pollution and Depletion of Natural Resources, Environmental Consequences

The regression presented in this point has its basis on the relationship between Environmental Control as a dependent variable, detected in the factor analysis as one of the factors for Environmental Concern; Pollution and Depletion of Natural Resources and Environmental Consequences as independent variables detected in the factor analysis as the factors for Environmental Perceived Knowledge.

Table 37: Results of Regression Analysis for Environmental Control

Results for Regression Analysis - Environmental Control (Dependent Variable), Pollution and Depletion of Natural Resources and Environmental Consequences.				
Parameter	Partial Regression Coefficient *(B)*	Standard Error	Standardized Regression Coefficient *(Beta)*	*t*-statistic
Intercept	-2.758	18.835		-.146
Pollution and Depletion of Natural Resources	1.147	2.987	.278	.384
Environmental Consequences	-.091	.810	-.081	-.112
F-Statistic	.193			
Significance of F	.834			
R^2	.114			
Adjusted R^2	-.477			
***p<.9**				

Source: The author.

Table 38: Pearson Correlation

Pearson Correlation			
	Environmental Exploitation	Pollution and	Environmental Consequences

		Depletion of Natural Resources	
Environmental Exploitation	1.000	.332	-.265
Pollution and Depletion of Natural Resources	.332	1.000	-.660
Environmental Consequences	-.265	-.660	1.000

Source: The author.

Table 39: Collinearity Statistics

Collinearity Statistics		
Model		
	Tolerance	VIF
Intercept		
Pollution and Depletion of Natural Resources	.564	1.773
Environmental Consequences	.564	1.773

Source: The author.

Following table 37 presenting regression analysis results for environmental control as dependent variable and pollution and depletion of natural resources and environmental consequences as independent variables, one can confirm the statistical significance of the regression with the results of F-Statistic of 0.193 and p<.9, the portion of variance from the dependent variable to the independent variables is 11,4% in R^2 and -47.7% in adjusted $R^{2,}$ reducing biases and meaning the low correlation levels within the variables.

Analysing regression coefficients *(B)* it is possible to see that that the variations of each independent variable have on the dependent variable, and these are 1.147 for variable 1 and -.091 for variable 2, meaning positive relation from dependent variable 1 to independent variable, and negative relation from variable 2 to independent variable. As for analysis of *(Beta)* for biases reducing, the values follow the same trend, positive relationship for first variable and negative relationship for the second

variable. Finally, at t-static there are no traces of values close to zero, which is confirmed by the correlation table showing that all variables are correlated.
Analysing these it is possible to achieve the following equation:

Environmental Control = Constant + [(β x Pollution and Depletion of Natural Resources) + (β x Environmental Consequences)]

Using the values of table 37 the equation is:

EC = - 2.758 + [(1.147 x Pollution and Depletion of Natural Resources) + (-.091 x Environmental Consequences)]

In the tolerance test it was not found values lower than .10 and VIF values not higher than 10, affirming that there is no multicollinearity, therefore these variables make the linear regression performed reliable.
Finally, considering all the regression analysis made for H7, it is possible to conclude that H7 is false.

4.4.4 H8: Environmental Attitude - Environmental Concern

The results of the factor analysis show the variable Environmental Attitude divided into four factors, which are Personal Environmental Attitude, Understated Environmental Attitude, Legal/Financial Environmental Attitude and Political Environmental Attitude. Therefore, the analysis will be conducted by each factor from the dependent variable to the factors of the independent variable.

Table 40: Hypothesis 8

Independent Variable	**Environmental Concern**	**Environmental Balance** **Environmental Exploitation** **Environmental Control**
Dependent Variable	**Environmental Attitude**	Personal Environmental Attitude Understated Environmental Attitude Legal/Financial Environmental Attitude Political Environmental Attitude

Source: The author.

4.4.4.1 Personal Environmental Attitude - Environmental Balance, Environmental Exploitation and Environmental Control

This regression is based on the relationship between Personal Environmental Attitude as a dependent variable, detected in the factor analysis as one of the factors for Environmental Attitude; Environmental Balance, Environmental Exploitation and Environmental Control as independent variables detected in the factor analysis as the factors for Environmental Concern.

Table 41: Results of Regression Analysis for Personal Environmental Attitude

Results for Regression Analysis - Personal Environmental Attitude (Dependent Variable), Environmental Balance, Environmental Exploitation and Environmental Control.				
Parameter	Partial Regression Coefficient *(B)*	Standard Error	Standardized Regression Coefficient *(Beta)*	*t*-statistic
Intercept	6.938	3.381		2.052
Environmental Balance	.078	.194	.224	.405
Environmental Exploitation	-.368	.793	-.330	-.463
Environmental Control	.264	.407	.468	.648
F-Statistic	.240			
Significance of F	.864			
R^2	.194			
Adjusted R^2	-.613			
***p<.9**				

Source: The author.

Table 42: Pearson Correlation

Pearson Correlation				
	Personal Environmental Attitude	Environmental Balance	Environmental Exploitation	Environmental Control

Personal Environmental Attitude	1.000	.282	.056	.318
Environmental Balance	.282	1.000	.297	.335
Environmental Exploitation	.056	.297	1.000	.682
Environmental Control	.318	.335	.682	1.000

Source: The author.

Table 43: Collinearity Statistics

Collinearity Statistics		
Model		
	Tolerance	VIF
Intercept		
Environmental Balance	.879	1.138
Environmental Exploitation	.529	1.889
Environmental Control	.515	1.940

Source: The author.

Following table 41 presenting regression analysis results for Personal Environmental Attitude as dependent variable and Environmental Balance, Environmental Exploitation and Environmental Control as independent variables, one can confirm the statistical significance of the regression with the results of F-Statistic of 0.240 and p<.9, the portion of variance from the dependent variable to the independent variables is 19,4% in R^2 and -61.3% in adjusted $R^{2,}$ reducing biases and meaning the low correlation levels within the variables.

Analysing regression coefficients *(B)* it is possible to see that that the variations of each independent variable have on the dependent variable, and these are .078 for variable 1, -.368 for variable 2 and .264 for variable 3, meaning positive relation from dependent variable 1 and 3 to independent variable, and negative relation from variable 2 to independent variable. As for analysis of *(Beta)* for biases reducing, the values follow the same trend, positive relationship for first and third variable and negative relationship for the second variable. Finally, at t-static there are no traces of

values close to zero, which is confirmed by the correlation table showing that all variables are correlated.
Analysing these it is possible to achieve the following equation:

Personal Environmental Attitude = Constant + [(β x Environmental Balance + (β x Environmental Exploitation) + (β x Environmental Control)]

Using the values of table 41 the equation is:

PEA = 6.938 + [(.078 x Environmental Balance + (-.368 x Environmental Exploitation) + (.264 x Environmental Control)]

In the tolerance test it was not found values lower than .10 and VIF values not higher than 10, affirming that there is no multicollinearity, therefore these variables make the linear regression performed reliable.

4.4.4.2 Understated Environmental Attitude - Environmental Balance, Environmental Exploitation and Environmental Control

This regression is based on the relationship between Understated Environmental Attitude as a dependent variable, detected in the factor analysis as one of the factors for Environmental Attitude; Environmental Balance, Environmental Exploitation and Environmental Control as independent variables detected in the factor analysis as the factors for Environmental Concern.

Table 44: Results of Regression Analysis for Understated Environmental Attitude

Results for Regression Analysis - Understated Environmental Attitude (Dependent Variable), Environmental Balance, Environmental Exploitation and Environmental Control.				
Parameter	Partial Regression Coefficient *(B)*	Standard Error	Standardized Regression Coefficient *(Beta)*	*t*-statistic
Intercept	1.032	2.991		.345
Environmental Balance	-.084	.172	-.228	-.489

Environmental Exploitation	.675	.702	.578	.962
Environmental Control	-.467	.360	-.788	-1.296
F-Statistic	.747			
Significance of F	.592			
R^2	.428			
Adjusted R^2	-.145			
***p<.6**				

Source: The author.

Table 45: Pearson Correlation

Pearson Correlation				
	Understated Environmental Attitude	Environmental Balance	Environmental Exploitation	Environmental Control
Understated Environmental Attitude	1.000	-.320	-.028	-.471
Environmental Balance	-.320	1.000	.297	.335
Environmental Exploitation	-.028	.297	1.000	.682
Environmental Control	-.471	.335	.682	1.000

Source: The author.

Table 46: Collinearity Statistics

Collinearity Statistics		
Model		
	Tolerance	VIF
Intercept		
Environmental Balance	.879	1.138
Environmental Exploitation	.529	1.889
Environmental Control	.515	1.940

Source: The author.

Following table 44 presenting regression analysis results for Understated Environmental Attitude as dependent variable and Environmental Balance, Environmental Exploitation and Environmental Control as independent variables, one can confirm the statistical significance of the regression with the results of F-Statistic of 0.747 and p<.6, the portion of variance from the dependent variable to the independent variables is 42,8% in R^2 and -14.5% in adjusted $R^{2,}$ reducing biases and meaning the low correlation levels within the variables.

Analysing regression coefficients *(B)* it is possible to see the variations of each independent variable have on the dependent variable, and these are -.084 for variable 1, .675 for variable 2 and -.467 for variable 3, meaning negative relation from dependent variable 1 and 3 to independent variable, and positive relation from variable 2 to independent variable. As for analysis of *(Beta)* for biases reducing, the values follow the same trend, negative relationship for first and third variable and positive relationship for the second variable. Finally, at t-static there are no traces of values close to zero, which is confirmed by the correlation table showing that all variables are correlated.

Analysing these it is possible to achieve the following equation:

Understated Environmental Attitude = Constant + [(β x Environmental Balance + (β x Environmental Exploitation) + (β x Environmental Control)]

Using the values of table 44 the equation is:

UEA = 1.032 + [(-.084 x Environmental Balance + (.675 x Environmental Exploitation) + (-.467 x Environmental Control)]

In the tolerance test it was not found values lower than .10 and VIF values not higher than 10, affirming that there is no multicollinearity, therefore these variables make the linear regression performed reliable.

4.4.4.3 Legal/Financial Environmental Attitude - Environmental Balance, Environmental Exploitation and Environmental Control

This regression is based on the relationship between Legal/Financial Environmental Attitude as a dependent variable, detected in the factor analysis as one of the factors for Environmental Attitude; Environmental Balance, Environmental Exploitation and Environmental Control as independent variables detected in the factor analysis as the factors for Environmental Concern.

Table 47: Results of Regression Analysis for Legal/Financial Environmental Attitude

Results for Regression Analysis - Legal/Financial Environmental Attitude (Dependent Variable), Environmental Balance, Environmental Exploitation and Environmental Control.				
Parameter	Partial Regression Coefficient *(B)*	Standard Error	Standardized Regression Coefficient *(Beta)*	*t*-statistic
Intercept	-5.188	8.427		-.616
Environmental Balance	-.208	.483	-.269	-.431
Environmental Exploitation	2.446	1.977	.997	1.237
Environmental Control	-.344	1.015	-.277	-.339
F-Statistic	.637			
Significance of F	.701			
R^2	.656			
Adjusted R^2	-.374			
***p<.7**				

Source: The author.

Table 48: Pearson Correlation

Pearson Correlation				
	Legal/Financial Environmental Attitude	Environmental Balance	Environmental Exploitation	Environmental Control

Legal/Financial Environmental Attitude	1.000	-.066	.728	.313
Environmental Balance	-.066	1.000	.297	.335
Environmental Exploitation	.728	.297	1.000	.682
Environmental Control	.313	.335	.682	1.000

Source: The author.

Table 49: Collinearity Statistics

Collinearity Statistics		
Model		
	Tolerance	VIF
Intercept		
Environmental Balance	.879	1.138
Environmental Exploitation	.529	1.889
Environmental Control	.515	1.940

Source: The author.

Following table 47 presenting regression analysis results for Legal/Financial Environmental Attitude as dependent variable and Environmental Balance, Environmental Exploitation and Environmental Control as independent variables, one can confirm the statistical significance of the regression with the results of F-Statistic of 0.637 and p<.7, the portion of variance from the dependent variable to the independent variables is 65,6% in R^2 and -37.4% in adjusted $R^{2,}$ reducing biases and meaning the low correlation levels within the variables.

Analysing regression coefficients *(B)* it is possible to see the variations of each independent variable have on the dependent variable, and these are -.208 for variable 1, 2.446 for variable 2 and -.344 for variable 3, meaning negative relation from dependent variable 1 and 3 to independent variable, and positive relation from variable 2 to independent variable. As for analysis of *(Beta)* for biases reducing, the values follow the same trend, negative relationship for first and third variable and positive relationship for the second variable. Finally, at t-static there are no traces of values

close to zero, which is confirmed by the correlation table showing that all variables are correlated.
Analysing these it is possible to achieve the following equation:

Legal/Financial Environmental Attitude = Constant + [(β x Environmental Balance + (β x Environmental Exploitation) + (β x Environmental Control)]

Using the values of table 47 the equation is:

LFEA = -5.188 + [(-.208 x Environmental Balance + (2.446 x Environmental Exploitation) + (-.344 x Environmental Control)]

In the tolerance test it was not found values lower than .10 and VIF values not higher than 10, affirming that there is no multicollinearity, therefore these variables make the linear regression performed reliable.

4.4.4.4 Political Environmental Attitude - Environmental Balance, Environmental Exploitation and Environmental Control

This regression is based on the relationship between Political Environmental Attitude as a dependent variable, detected in the factor analysis as one of the factors for Environmental Attitude; Environmental Balance, Environmental Exploitation and Environmental Control as independent variables detected in the factor analysis as the factors for Environmental Concern.

Table 50: Results of Regression Analysis for Political Environmental Attitude

Results for Regression Analysis - Political Environmental Attitude (Dependent Variable), Environmental Balance, Environmental Exploitation and Environmental Control.

Parameter	Partial Regression Coefficient *(B)*	Standard Error	Standardized Regression Coefficient *(Beta)*	*t*-statistic
Intercept	-8.624	13.442		-.642
Environmental Balance	-.332	.771	-.271	-.431

Environmental Exploitation	2.656	3.153	.683	.842
Environmental Control	.446	1.619	.226	.275
F-Statistic	.623			
Significance of F	.705			
R^2	.652			
Adjusted R^2	-.394			
***p<.7**				

Source: The author.

Table 51: Pearson Correlation

Pearson Correlation				
	Political Environmental Attitude	Environmental Balance	Environmental Exploitation	Environmental Control
Political Environmental Attitude	1.000	.008	.757	.602
Environmental Balance	.008	1.000	.297	.335
Environmental Exploitation	.757	.297	1.000	.682
Environmental Control	.602	.335	.682	1.000

Source: The author.

Table 52: Collinearity Statistics

Collinearity Statistics		
Model		
	Tolerance	VIF
Intercept		
Environmental Balance	.879	1.138
Environmental Exploitation	.529	1.889
Environmental Control	.515	1.940

Source: The author.

Following table 50 presenting regression analysis results for Political Environmental Attitude as dependent variable and Environmental Balance, Environmental Exploitation and Environmental Control as independent variables, one can confirm the statistical significance of the regression with the results of F-Statistic of 0.623 and p<.7, the portion of variance from the dependent variable to the independent variables is 65,2% in R^2 and -39.4% in adjusted $R^{2,}$ reducing biases and meaning the low correlation levels within the variables.

Analysing regression coefficients *(B)* it is possible to see the variations of each independent variable have on the dependent variable, and these are -.332 for variable 1, 2.656 for variable 2 and .446 for variable 3, meaning positive relation from dependent variable 2 and 3 to independent variable, and negative relation from variable 1 to independent variable. As for analysis of *(Beta)* for biases reducing, the values follow the same trend, positive relationship for second and third variable and negative relationship for the first variable. Finally, at t-static there are no traces of values close to zero, which is confirmed by the correlation table showing that all variables are correlated.

Analysing these it is possible to achieve the following equation:

Political Environmental Attitude = Constant + [(β x Environmental Balance + (β x Environmental Exploitation) + (β x Environmental Control)]

Using the values of table 50 the equation is:

PEA = -8.624 + [(-.332 x Environmental Balance + (2.656 x Environmental Exploitation) + (.446 x Environmental Control)]

In the tolerance test it was not found values lower than .10 and VIF values not higher than 10, affirming that there is no multicollinearity, therefore these variables make the linear regression performed reliable.

After the analysis of all these factors and variables, it is possible to conclude that H8 is false.

4.4.5 H4: Attitude Towards Use - Perceived Usefulness

Table 53: Hypothesis 4

Independent Variable	**Perceived Usefulness**	**Perceived Usefulness**
Dependent Variable	Attitude Towards Use	Attitude Towards Use

Source: The author.

The following regression was performed regarding the relationship between Attitude Towards Use as dependent variable, and Perceived Usefulness as independent variable, both detected in the factor analysis as factors for the same variables.

Table 54: Results of Regression Analysis for Attitude Towards Use

Results for Regression Analysis - Attitude Towards Use (Dependent Variable), Perceived Usefulness.				
Parameter	Partial Regression Coefficient *(B)*	Standard Error	Standardized Regression Coefficient *(Beta)*	*t*-statistic
Intercept				
Perceived Usefulness	1.561	.051	.997	30.884
F-Statistic	953.810			
Significance of F	.000			
R^2	.995			
Adjusted R^2	.994			
***p<.000**				

Source: The author.

Table 55: Pearson Correlation

Pearson Correlation		
	Attitude Towards Use	Perceived Usefulness
Attitude Towards Use	1.000	.997
Perceived Usefulness	.997	1.000

Source: The author.

Table 56: Collinearity Statistics

Collinearity Statistics		
Model		
	Tolerance	VIF
Intercept		
Perceived Usefulness	1.000	1.000

Source: The author.

Following table 54 which presents the results for regression analysis considering attitude towards use as the dependent variable and Perceived Usefulness as independent variable, it is possible to confirm the statistical significance of the regression with the results of F-Statistic of 953 and p<.000, the portion of variance from the dependent variable to the independent variables is 99,5% in R^2 and 99.4% in adjusted $R^{2,}$ reducing biases and meaning the high correlation levels within the variables.

Analysing regression coefficients *(B)* it is possible to see that the variation that independent variable has on the dependent variable is positive, supported by analysis of *(Beta)* for biases reducing, the value is still positive, confirming the similar variation that the independent variable has on the dependent variable. Finally, at t-static there are no traces of values close to zero, which is confirmed by the correlation table showing that all variables are correlated.

Analysing these it is possible to achieve the following equation:

Attitude Towards Use = Constant + [(β x Perceived Usefulness)]

Considering that there is no constant for this regression, the equation based on 54 is:

Attitude Towards Use = 1.561 x Perceived Usefulness

In the tolerance test it was not found values lower than .10 and VIF values not higher than 10, affirming that there is no multicollinearity, therefore these variables make the linear regression performed reliable and the hypothesis true.

4.4.6 H6: Attitude Towards Use - Perceived Ease of Use

Table 57: Hypothesis 6

Independent Variable	**Perceived Ease of Use**	**Perceived Ease of Use**
Dependent Variable	Attitude Towards Use	Attitude Towards Use

Source: The author.

The following regression was performed regarding the relationship between Attitude Towards Use as dependent variable, and Perceived Ease of Use as independent variable, both detected in the factor analysis as factors for the same variables.

Table 58: Results of Regression Analysis for Attitude Towards Use

Results for Regression Analysis - Attitude Towards Use (Dependent Variable), Perceived Ease of Use.				
Parameter	Partial Regression Coefficient *(B)*	Standard Error	Standardized Regression Coefficient *(Beta)*	*t*-statistic
Intercept				
Perceived Usefulness	1.161	.020	.999	58.701
F-Statistic	3445			
Significance of F	.000			
R^2	.999			
Adjusted R^2	.998			
***p<.000**				

Source: The author.

Table 59: Pearson Correlation

Pearson Correlation		
	Attitude Towards Use	Perceived Ease of Use
Attitude Towards Use	1.000	.999
Perceived Ease of Use	.999	1.000

Source: The author.

Table 60: Collinearity Statistics

Collinearity Statistics		
Model		
	Tolerance	VIF
Intercept		
Perceived Ease of Use	1.000	1.000

Source: The author.

Following table 58 which presents the results for regression analysis considering attitude towards use as the dependent variable and Perceived Ease of Use as independent variable, it is possible to confirm the statistical significance of the regression with the results of F-Statistic of 3445 and p<.000, the portion of variance from the dependent variable to the independent variables is 99,9% in R^2 and 99.8% in adjusted $R^{2,}$ reducing biases and meaning the low correlation levels within the variables.

Analysing regression coefficients *(B)* it is possible to see that the variation that independent variable has on the dependent variable is positive, supported by analysis of *(Beta)* for biases reducing, the value is still positive, confirming the similar variation that the independent variable has on the dependent variable. Finally, at t-static there are no traces of values close to zero, which is confirmed by the correlation table showing that all variables are correlated.

Analysing these it is possible to achieve the following equation:

Attitude Towards Use = Constant + [(β x Perceived Ease of Use)]

Considering that there is no constant for this regression, the equation based on 58 is:

Attitude Towards Use = 1.161 x Perceived Ease of Use

In the tolerance test it was not found values lower than .10 and VIF values not higher than 10, affirming that there is no multicollinearity, therefore these variables make the linear regression performed reliable and the hypothesis true.

4.4.7 H9: Attitude Towards Use - Environmental Attitude

Table 61: Hypothesis 9

Independent Variable	**Environmental Attitude**	**Personal Environmental Attitude** **Understated Environmental Attitude** **Legal/Financial Environmental Attitude** **Political Environmental Attitude**
Dependent Variable	Attitude Towards Use	Attitude Towards Use

Source: The author.

The following regression was performed regarding the relationship between Attitude Towards Use as dependent variable, and Environmental Attitude as independent variable, composed by the factors Personal Environmental Attitude, Understated Environmental Attitude, Legal/Financial Environmental Attitude, Political Environmental Attitude.

Table 62: Results of Regression Analysis for Attitude Towards Use

Results for Regression Analysis - Attitude Towards Use (Dependent Variable), Personal Environmental Attitude, Understated Environmental Attitude, Legal/Financial Environmental Attitude and Political Environmental Attitude.				
Parameter	Partial Regression Coefficient *(B)*	Standard Error	Standardized Regression Coefficient *(Beta)*	*t*-statistic
Intercept				
Personal Environmental Attitude	.556	.129	.566	4.322
Understated Environmental Attitude	-.134	.420	-.057	-.318
Legal/Financial Environmental Attitude	1.227	.470	1.032	2.613
Political Environmental Attitude	-.738	.277	-.544	-2.669
F-Statistic	2908			

Significance of F	.000
R^2	1.000
Adjusted R^2	.999
***p<.000**	

Source: The author.

Table 63: Pearson Correlation

Pearson Correlation					
	Attitude Towards Use	Personal Environmental Attitude	Understated Environmental Attitude	Legal/Financial Environmental Attitude	Political Environmental Attitude
Attitude Towards Use	1.000	.999	.998	.997	.989
Personal Environmental Attitude	.999	1.000	.996	.996	.989
Understated Environmental Attitude	.998	.996	1.000	.997	.990
Legal/Financial Environmental Attitude	.997	.996	.997	1.000	.997
Political Environmental Attitude	.989	.989	.990	.997	1.000

Source: The author.

Table 64: Collinearity Statistics

Collinearity Statistics		
Model		
	Tolerance	VIF
Intercept		

Personal Environmental Attitude	.005	199.914
Understated Environmental Attitude	.003	374.272
Legal/Financial Environmental Attitude	.001	1816.292
Political Environmental Attitude	.002	484.055

Source: The author.

Following table 62 which presents the results for regression analysis considering attitude towards use as the dependent variable, and Environmental Attitude as independent variable, composed by the factors Personal Environmental Attitude, Understated Environmental Attitude, Legal/Financial Environmental Attitude, Political Environmental Attitude, it is possible to confirm the statistical significance of the regression with the results of F-Statistic of 2908 and p<.000, the portion of variance from the dependent variable to the independent variables is 100% in R^2 and 99,9% in adjusted $R^{2,}$ meaning high correlation among the variables analysing regression coefficients *(B)* it is possible to see that the variation that independent variables have on the dependent variable is positive for the first and third factors and negative for the second and forth factor. This affirmation supported by analysis of *(Beta)* for biases reducing, the values follow the same sequence for negative and positive, confirming the similar variation that the independent variable have on the dependent variable. Finally, at t-statistic there are no traces of values close to zero, which is confirmed by the correlation table showing that all variables are correlated.

Analysing these it is possible to achieve the following equation:

Attitude Towards Use = Constant + [(β x Personal Environmental Attitude) + (β x Understated Environmental Attitude) + (β x Legal/Financial Environmental Attitude) + (β x Political Environmental Attitude)]

Considering that there is no constant for this regression, the equation based on 62 is:

Attitude Towards Use = [(.556 x Personal Environmental Attitude) + (-.134 x Understated Environmental Attitude) + (1.227 x Legal/Financial Environmental Attitude) + (-.738 x Political Environmental Attitude)]

In the tolerance test all values are lower than .10 and VIF values are higher than 10, confirming the multicollinearity in this, which makes it hard to identify the unique contribution of each factor on the variable and on the independent variable. Considering that we are testing the variable Environmental Attitude - the items presented are factor of this variable, it is not necessary to identify which factor has a larger influence, the view of this research would be in the whole set of factors that form the variable itself, therefore it was decided that the analysis, in this case, is significant and the hypothesis is true.

4.4.8 H10: Actual Use - Attitude Towards Use

The final regression according to the conceptual model of this research would be Actual Use as dependent variable and Attitude Towards Use as independent variable, but this regression will not be performed considering that no factors on the variable Actual Use were extracted in the factor analysis due to its low Cronbach Alpha value registered, the variable is not reliable for the research, there is no correlation among the question and low level of relevance, therefore the variable Actual Use has been excluded and H10 is no longer on the research.

4.5 Discussion

After the statistical analysis of the conceptual model and its hypothesis presented on the beginning of this chapter, now it will be discussed the results of the testing of the hypothesis and the final conceptual model tested and validated.
As presented on the discussion developed on the end of the statistical analysis chapter, the aim is to check if the hypothesis arisen during the development of the conceptual model are proven or not.

Table 65: Multiple Regression and Multicollinearity Test

Dependent Variable	Independent Variable	t-statistic	f-statistic	Correlation	Tolerance	VIF

Perceived Usefulness	Feelings	.074	.003	.000	.164	6.096
	Morality	.000	.003	-,020	.453	2.208
	Image	-.020	.003	-.014	.952	1.051
	Enjoyment	.103	.003	.055	.246	4.069
Environmental Balance	Pollution and Depletion of Natural Resources	-.111	.377	-.019	.564	1.773
	Environmental Consequences	-.720	.377	.206	.564	1.773
Environmental Exploitation	Pollution and Depletion of Natural Resources	-.736	.329	-.170	.564	1.773
	Environmental Consequences	-.743	.329	-.179	.564	1.773
Environmental Control	Pollution and Depletion of Natural Resources	.384	.193	.332	.564	1.773
	Environmental Consequences	-.112	.193	-.265	.564	1.773
Personal Environmental Attitude	Environmental Balance	.405	.240	.282	.879	1.138
	Environmental Exploitation	-.463	.240	.056	.529	1.889
	Environmental Control	.648	.240	.318	.515	1.940
Understated Environmental Attitude	Environmental Balance	-.489	.747	-.320	.879	1.138
	Environmental Exploitation	.962	.747	-.028	.529	1.889
	Environmental Control	-1.296	.747	-.471	.515	1.940
Legal/Financial Environmental Attitude	Environmental Balance	-.431	.637	-.066	.879	1.138
	Environmental Exploitation	1.237	.637	.728	.529	1.889
	Environmental Control	-.339	.637	.313	.515	1.940

Political Environmental Attitude	Environmental Balance	-.431	.623	.008	.879	1.138
	Environmental Exploitation	.842	.623	.757	.529	1.889
	Environmental Control	.271	.623	.602	.515	1.940
Attitude Towards Use	Perceived Usefulness	30.884	953.810	.997	1.000	1.000
	Perceived Ease of Use	58.701	3445	.999	1.000	1.000
	Personal Environmental Attitude	4.332	2908	.999	.005	199.914
	Understated Environmental Attitude	-.318	2908	.998	.003	374.272
	Legal/Financial Environmental Attitude	2.613	2908	.997	.001	1816.292
	Political Environmental Attitude	-2.669	2908	.989	.002	484.055

Source: The author.

Starting with the Hypothesis 1, as personal norm is positively related to perceived usefulness, considering that the variable Personal Norm was split into two factors, Feelings and Morality, and the analysis of these have resulted on the factor morality having very little effect on the Personal Norm variable, one can conclude that H1 is partially valid, hence for the factor Feelings there is positive relation, but for the factor Morality there is no relation, therefore the author is refining the H1 to*: Personal Norm Variable split into Feelings and Morality factors, the factor Feelings is positively related to Perceived Usefulness; the factor Morality is not related to Perceived Usefulness.* This refined H1 is considered true.

As for Hypothesis 2 *Image is positively related to Perceived Usefulness*, statistical analysis has confirmed the hypothesis with acceptable level of correlation, relevance and significant.

Hypothesis 3, *Enjoyment is positively related to Perceived Usefulness,* it has also been proven true in the statistical analysis and was kept on the final conceptual model.

Looking at the work developed and the results of the hypothesis presented, the researcher can conclude that the variable Perceived Usefulness is influenced by the variables Feelings, Image and Enjoyment, the variable Morality is not to be considered, so the final costumer has his/hers attitudes on the Perceived Usefulness perspective, influenced by his/hers Feelings, Image and Enjoyment. Continuing this line if thought, Hypothesis 4 which is *Perceived Usefulness is positively related to Attitude Towards Use,* after the statistical analysis it is concluded that the hypothesis is true, there are high levels of correlation, relevance and significant among the variables in a positive sense, so there the author understands that the variable Perceived Usefulness - based on the TAM model (Davis, 1989) directly affects the variable attitude towards use in a positive way. If the final costumer feels that the Perceived Usefulness (formed by personal feelings, personal image and personal enjoyment) on adopting renewable energy technologies is positive, so it is more likely that the attitude of adopting renewable energy technologies will be positive.

Looking at the variable Perceived Ease of Use, also based on TAM Model (Davis, 1989) one can consider *Hypothesis 5: Perceived Consumer Effectiveness is positively related to Perceived Ease of Use,* which was found null on the factor analysis stage, it was considered irrelevant and unreliable, therefore no regression was made for this hypothesis.

On Hypothesis 6, after the statistical analysis performed, it was concluded that *Perceived Ease of Use is positively related to Attitude Towards Use* is a true hypothesis with high levels of correlation, relevance and significant among the variables in a positive sense.

Looking at Tam Model and the variable Perceived Ease of Use, as it has been proven positively connected to Attitude Towards Use, meaning that the influence in the attitude of the final user is positively connected to Perceived Usefulness and Perceived Ease of Use.

Considering Hypothesis 7 which is *Environmental Perceived Knowledge is positively related to Environmental Concern,* both variables Environmental Perceived Knowledge and Environmental Concern were tested for factors, and variable Environmental Perceived Knowledge has resulted for two factors, Pollution and Depletion of Natural Resources and Environmental Consequences, while the variable Environmental Concern resulted in the factors Environmental Balance, Environmental Exploitation and Environmental Control. It was performed 3 regression tests

considering the three factors of the dependent variable. The results found in these regressions are of negative relation among the variables with exclusion of the relation of the factors Environmental Perceived Knowledge and Environmental Control, which have a positive relation; finally it is possible to conclude that Hypothesis 7 is false, meaning that Environmental Perceived Knowledge is not related to Environmental Concern, people do not need a certain level of knowledge to be concerned for the environment, although it has the power to enhance the level of concern, it is not necessary.

In Hypothesis 8 the author tests if Environmental Concern is positively related to Environmental Attitude, in this case also both variables have many factors to be tested, in Environmental Concern are the same factors as described in Hypothesis 7, for Environmental Attitude (dependent variable) we have the following factors: Personal Environmental attitude, Understated Environmental Attitude, Legal/Financial Environmental Attitude and Political Environmental Attitude. After analysing each factor of these variables, it was reached a result that the Hypothesis 8 is false, Environmental Concern is not positively related to Environmental Attitude, the user/buyer does not have to concerned about the environment to have a positive attitude towards the environment, although concern can be a driver, it is not necessary.

Hypothesis 9 consists on the positive relation between Environmental Attitude and Attitude Towards Use. After the statistical analysis among these variables and its factors, the author reached the conclusion that H9 is true, therefore the user should have a positive environmental attitude to have a positive attitude towards use of renewable energy technologies.

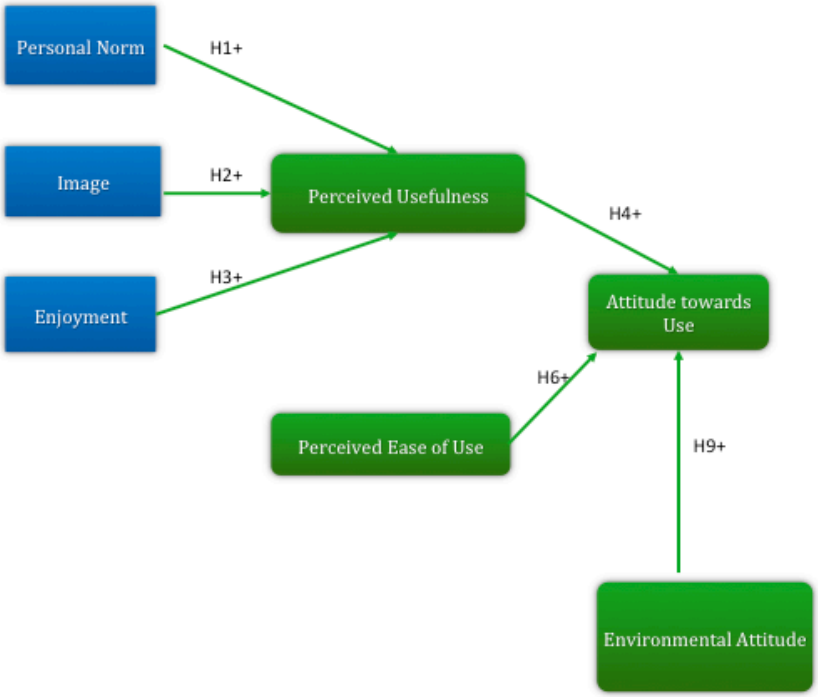
Finally, in H10, the variable Actual Use was dismissed in the factor analysis stage, Cronbach and KMO values found suggested that the variable is not reliable nor relevant to the research, making the H10 null.

Looking at these results on the statistical analysis, attitude towards use is influenced by perceived usefulness, perceived ease of use and environmental attitude. Although many variables were removed like environmental concern and perceived environmental knowledge, the results analysis managed to keep not only the variables from TAM model, but also the extra variable environmental attitude which constituted the attemptive to add another dimension to TAM model in this research, meaning that not only personal behavioural variables which constitute usefulness and easiness, but

also a variable of personal, legal and financial status can influence attitude towards use.

With this analysis concluded, it is possible to present the new conceptual model of this research, statistically tested to be relevant and reliable for the research.

FIGURE 16: CONCEPTUAL MODEL



Source: The author.

Considering the Final Conceptual Model presented above, there were many hypotheses that were not true, leading to the extermination of these variables from the conceptual model.

4.6 Conclusion

This research's phase was constituted in presenting and testing hypothesis arisen based on the literature review presented and the models chosen to guide the researcher's work. On this chapter the researcher presented the proposed research framework designed to respond the main research question statistical analysis of the data collected on the quantitative stage of this research. This data was analysed by a

factor analysis and had these factors submitted to a regression analysis, which concluded on the hypothesis testing and lead to the final conceptual model presented in the end of the chapter.

This proven conceptual model will now be used on the learning set phase of the research and applied on the organization for final testing on actual negotiation processes and how it affects purchasing decision of the customer on acquiring renewable energy technology products. By applying this conceptual model in an organization that deals with the population chosen for the research, it will be possible to understand what variables have a higher to lower effect on the attitude towards use of renewable energy technologies in Brazil, it will also provide this research some extent of what variables are missing or are not being considered on this that also affect attitude towards use, which will open new possibilities to be analysed in the future.

Chapter 5: Action Research

The usage of quantitative methods in action research has been under discussion for some time, Greenwood & Levin (1998) discuss the reason that other scientists pose for the misconception on associating action research with qualitative/quantitative methods come from the lack of rigor - non-scientific method - that data collected in a research with such methodological structure present, specially because it involves action. In response to this argument, Martí (2015) discusses how quantitative or mixed methods can be integrated in the participatory dynamics of action research, the author also argues that the tools used on action research are assisting people and groups, networking, promoting and planning action and other, which do not fit with the traditional tools for quantitative or qualitative research. Martí (2015) proposes four approaches for successfully integrating action research and mixed methods, in this work we will be focusing on the approach consisting QUAN➔PART, which is developed in the following sequence: first the application of QUAN (quantitative methods), which aims to improve reflection process of the evidence found in the data collection phase, the role of the participant in this process is of data receivers and the action research cycle which that this process is based in is Observe➔Reflect.

There are many definitions of Action Research, these depend on the environment which Sets are formed, its requirements, members, values, drivers and purposes. (Williams, 2001), these all can be defined by the person who is managing the process to achieve certain purpose. Although this statement is true, there are some authors that provide a definition about action research, such as Pedlar (1997), which defines AL as a method that, by using group learning and problem solving, brings changes in individual, group and organizational level, in which learning is focused on the definition of McGill and Beaty (1992) as a process whose outcome is the change or intention to change.

Considering the information above, the researcher has applied learning sets with the participants to allow the action R process to take place. This learning process is very important in this research; therefore, it should be correctly positioned in the organization to provide the best learning and reflecting process possible.

5.1 Learning Set

As presented on the Introduction and Literature Review, this research is an action research; it aims to explore reflection of a specific issue in a specific environment, to develop new knowledge based not only on data collection and/or observation, but also on action. Per Revans (1985) knowledge is the product of action, making the Learning Set a tool that will provide the knowledge of barriers to be broken, examination of previous experiences and combat of personal defensive mechanisms on the team. Revans (1978) defined Learning Set as description of the procedures and tensions faced by the mediators. With this understanding and the resources of the author to develop this work, the best choice found to apply this methodology in the research was to make usage of the Learning set tool.

The Learning Set (LS) is a tool for action research modality (Raelin, 2009) that has focus on professional learning and continuous reflection to solve real-life problems in their organization. Per Shani and Pasmore (1985), a good action research can be evaluated on the presentation of its context; quality of relationships; quality of the action research process itself and presented outcomes. The researcher, following Shani and Pasmore's (1985) framework, has so far developed a work where real-life issue is presented, mixed methodology used and finally the usage of a reliable action research tool for exploration or the research problem and previous data collected and outcomes can be achieved on a reliable structure, this tool is the learning set.

It is important to focus on the learning itself, learning cooperatively and problem based learning, for this to be accomplished the researcher will initially explore the research question.

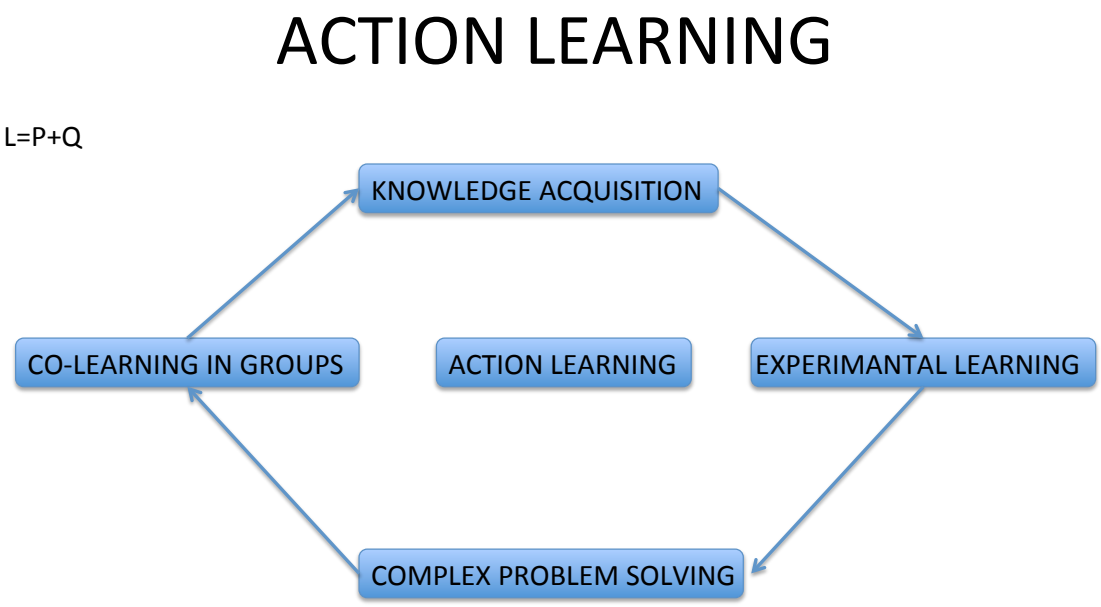
The initial step towards the exploration of the data collected in the Action Research process, is transforming the data collected into questions for the learning set application.

The learning set is where the reflection process happens, the participants are engaged and encourage to reflecting on the results presented and how can these be used on the real-life problem solve in a certain environment - in this case, in their organization.

The development of a learning set structure is as important as the reflective process itself to ensure the success of the action learning process, therefore hereunder will be presented the process that was adopted on the development of the learning set itself, its' structure, application, discussion, reflection and results.

Therefore, understanding the importance of the Action Learning Cycle to be adopted, the researcher has adopted the action learning cycle by Revans (1980).

FIGURE 17: ACTION LEARNING CYCLE.



Source: Revans (1980).

This action learning cycle presented by Revans (1980) is based on its formula L=P+Q, which is Learning=Programing + Questioning. The action research planning will be based on first, learning what is the status that the issue to be considered is, by using the first session of the learning set, which will result in actions taken that will result a response from the organization and costumers, which will help on understanding what is the problem in stake.

The second learning set problem will consist on the discussion of the results of the actions taken, understanding the full scope of the problem in hand and proposal of new ways of working by the team to strike the complex problem. From the second learning set, development of group learning will naturally happen, the participants will

discuss and understand each other's experiences to get to an action plan to be applied. On grounds of this research, the action research part will end at the second learning set, but the participants at the organization are encouraged to continue this practice, if it is providing good results, to solve the issue being discussed and others.

5.1.1 Learning Set Planning and Development

When looking for indicators of expected learning sets outcomes, it is important to understand and focus on behaviours such as mentioning by Mumford (1997):

- Enabling participants to share appropriately anytime;
- Establishing a non-defensive posture about own actions and learning;
- Establishing a supportive posture about issues of others;
- Establishing openness to new issues and responses;
- Establishing analytical posture;
- Use a questioning style that does not support self-defensiveness;
- Establishing a posture of listening and accepting help;
- Establishing a creative posture to problems;
- Establishing an innovative posture from learnings;
- Establishing a posture of risk taking;
- Adopting task and learning cycles;
- Make use of strength of others and motivate others as learners.

These behaviours are key to ensure a successful application of a learning set posture, and on this paper, it was explored and applied by researcher with participants and encouraged for participants to learn and apply on the researcher as well.

The first steps on the learning set development were composed of its planning, which was designed to attend the needs of this research and the organization that the learning set is being applied; the second step is the application, composed by the learning set sessions, discussion and results.

During the learning set planning, the researcher started by choosing the organization, people and products which it would be applied, based on 3Ps of marketing mix (Kotler at. al., 2002) people, process and product. In this case people refers to the team that is participating on the learning set, product is the range of products being analysed and process is the selling process of these products to the final market, an important part of the discussion and reflection of the learning set.

The learning set in this work was applied in an organization that sells products based on renewable energy technologies and products that are based on basic energy technologies, such as fossil energy based products. This organization is among the larger players in the market of transmission and distribution in Brazil. It participates on the largest investments in renewable energy technologies and has a large array of products, from rechargeable batteries and led light bulbs to dry-type cast resin transformers, pad mounted transformers with vegetable oil.

The researcher has applied the learning set on the sales team of the organization in study, composed by the managers of all the major geographic areas in Brazil. This organization sells all over Brazil energy products manufactured with all the technologies types that are accepted and commercialized in the Brazilian market. The discussion of the learning set was conducted around the main question of this research, considering that the focus is to understand the constraints for adoption of renewable energy technologies, the learning sets were based on these constraints and the experience of the participants with these products.

Two learning set sessions were applied, the first on January 27th of 2016 and the second session happened on March 21st of 2016. It was important to provide enough time between the sessions so the participants could try to apply the constraints discussed and could see results (sales increase/decrease) considering that the negotiation process of the products of this organization can take minutes to months, depending on the product and aggregated value being negotiated.

The questions applied on the learning sets were developed based on the results of the statistical analysis previously presented on this work. The questions applied on the learning sets were developed to encourage the behaviours presented by Mumford (1997), based on a meeting that encourages expression of ideas, thoughts, experiences and discussion focused on the research question of this research. These learning sets sessions aim to confirm or refute the hypothesis previously developed in this paper in the conceptual model and data collection and analysis, understand the reasons for this confirmations and refusals and provide new strategies and hypothesis to answer the research's question.

The questions applied in the learning set sessions are presented on the following table.

Table 66: Learning Set Questions

Learning Set Questions		
Session 1	Q1	When considering renewable energy technologies adoption by the society, what constraints per your opinion affect the adoption process?
	Q2	How do you perceive the constraints presented on the model?
	Q3	How do you believe that environmental attitude affects renewable energy technologies adoption by the society?
	Q4	What are the factors that make the use of renewable energy technologies easy or difficult?
Session 2	Q1	Based on Stage 1 proposed action, what are the results?
	Q2	What are the main differences from the results presented and your opinion regarding the questions on stage 1? Have these affected your personal opinion? How?
	Q3	Do these results have any effect in the organization and in your team? What are the effects? How is the organization and your team dealing with it?
	Q4	Do you have any ideas on how your working method can be changed to adapt to the situation presented? Do you believe this is worthy for you, your team and your organization?

Source: The author.

5.1.2 Learning Set Application

The learning set application process is supposed to provide freedom for the discussion and reflection of the matters in stake, using the questions posed by the mediator as simple guidelines to ensure that the team does not forget the purpose and focus of the meetings.

In this work, action research was conceptualized in 2 learning set meetings, with objective to engage the team to explore the presented data, discuss, apply and present final achievements with comments.

As described before, the learning set was applied in an organization whose business consists on the sales of equipment of high to low voltage, with a vast range of products that have a variation on their materials and technologies, which includes the use of renewable energy technologies. The participants chosen for the learning sets meetings where sales managers that, together, covered the whole Brazilian market.

These are the following: Business Development Manager, National Sales Manager, Regional Sales Manager for Rio de Janeiro area, Regional Sales Manager for São Paulo area and Regional Sales Manager for southern area.

5.1.2.1 Learning Set - Meeting 1

Following the already presented behaviours by Mumford (1997), the researcher applied the developed questions based on previous conceptual model developed and tested in the process of data collection and statistical testing previously explored in the former chapters.

On the beginning of the first session, it was presented a material with the main research question and the developments so far. The research was explained as the behaviours cited by Mumford (1997), so that an environmental of self-expression and learning is created.

After that, the mediator of the meeting required the participants to consider among themselves the relevance and reality reflection of the hypothesis presented with an open mind to introduce in their discussion new variables that could also be relevant in the case.

Next followed the set of questions for learning set 1, already described above, which generated the following comments:

5.1.2.1.1 QUESTION 1 - CONSTRAINTS THAT AFFECT THE ADOPTION PROCESS

The initial question the researcher made on the learning set 1 is When considering renewable energy technologies adoption by the society, what constraints per your opinion affect the adoption process? The major constraint for adoption of renewable energy technologies in Brazil is the high cost of such products, there is a predisposition of the costumer to receive proposals with renewable energy technologies products, the costs are high and the return time of the investment is also high for large purchases.

The variable cost was not considered on the conceptual model of this research, but it was agreed upon all the members in the learning set to be the major constraint. They have stated experiences where the cost difference is much higher than 10%, and considering the energy costs, the relation for costs saving is very slow, meaning that it would take from 10 years or more to regain the investments.

Some cited the possibility of financial aid for these investments, an exclusive line of credit developed by the government to reduce these costs impacts on the investors, the team understood that this would be a possibility to reduce the impact of costs for high investments in generation fields based on renewable energy technologies and might enhance its acceptance and usage, causing an increase in the demand and finally reducing prices due to increase in the competition and economy of scale.
Considering purchases of small items - batteries, LED lamps... - the variable cost was not considered with most impact on decision, although renewable energy technologies are more expensive, when considering small purchases the return on investment is much faster, leaving space for other constraints to be considered, such as environmental attitude.

5.1.2.1.2 QUESTION 2 - CONSTRAINTS ON THE CONCEPTUAL MODEL

The group commented on the Brazilian market there is a low level of environmental perceived knowledge, its general understanding that Brazil is starting to invest in high efficiency motors, appliances, state of art technologies, but these are all long-term investments. The lack of financial aid for the companies who are investing in these technologies is also another point to be considered. The participants have shared an experience within their own organization, which states the efforts of the organization to produce and sell transformers that operate with vegetal oil, instead of mineral oil. The organization has acquired the technology to do so, but then there was the work that the organization had to do in its sales process, capacitating their sellers to understand the environmental advantages of the product. The investment in this capacitation was done, but the return in sales was not as expected, considering that when the sellers started to explain the environmental issues to be considered, the costumers did not care or took in consideration as an important part of their purchasing decision process. Therefore, the market's acceptance of this product was happening in a much lower speed than expected.
As commented in the first questions, the participants have also raised the cost issue, with a feeling that the Brazilian costumer is not willing to pay a difference larger than 10% for renewable energy technology products, and again, the financial aid through special investment funding would speed the process.

5.1.2.3 QUESTION 3 - ENVIRONMENTAL ATTITUDE EFFECTS ON RENEWABLE ENERGY TECHNOLOGIES ADOPTION

The participants have stated little effect of environmental attitude in renewable energy technology adoption. This change has been moved by government to substitute energy matrix, making incentives and providing information to the general public interested in the importance of the environmental attitude in the country, and the importance of it by the final consumers, but due to little environmental knowledge of the general population, there is not much change in the general public. Educating the population is a process that can take time, and these incentives and programs being applied by the government are not strong enough for a quick result in the society.

The large change now that the participants stated that is being perceived by the organization is driven towards a problematic energy matrix currently installed in Brazil - with is large base on hydroelectric energy production, making the country susceptible to climate changes and lack of rain - the government is making some investments towards renewable energy technology knowledge, development and acceptance for final costumers belonging to the investment on wind power generation parks.

5.1.2.4 QUESTION 4 - FACTORS THAT FACILITATE AND HINDERS THE USE OF RENEWABLE ENERGY TECHNOLOGIES

Considering investments in high scale, the use of renewable energy technologies is simpler, easier to use, faster to build, faster to get the necessary licenses. They also have these same characteristics when considering products for end consumers, such as batteries, LED lamps and other items. So, the participants have not stated important factors, they understand that the development in technology will only make products and equipment easier and self-sufficient, making this question irrelevant.

By the end of the problem discussion and reflection process, the mediator asked the participants to try to change their perceived reality by engaging in some different sales philosophies, the challenge exposed to the participants was to try to sell more renewable energy technology related products by focusing on the conceptual model of the research, in other words, they were supposed to explore variables perceived usefulness, perceived ease of use and environmental attitude in their sales processes, focusing to see the real result that the usage of these variables in a negotiation process had on the final purchase decision on the costumers.

Considering the length of certain sales processes for larger equipment, the time given for this trial was of almost two months, from Jan 22nd to March 26th.

5.1.2.2 Learning Set - Meeting 2

On the next learning set, which took place on March 27th, the focus was to present and discuss the experiences that the sales personnel had during this time trying a new approach for selling renewable energy technologies products based on the learning set meeting 1.
Following the same methodology used on the meeting of learning set 1, the mediator posed some questions aiming to encourage discussion and reflection process during the meeting.
Next is presented the results of discussion and reflective process.

5.1.2.2.1 QUESTION 1 - RESULTS FROM STAGE 1

The participants stated their stress of the variable Environmental Attitude to increase sales, surpassing the Price relevance on the purchasing decision process as already discussed on Learning Set 1, and their statement on the Learning Set 2 was that variable Environmental Attitude does not make enough pressure on the purchasing decision process to surpass price.
The team stated that, since the variables Perceived Usefulness and Perceived Ease of Use were already agreed to be relevant and existent on the purchasing decision process, but not enough to surpass the price variable in influencing Attitude Towards Use, they focused on using the variable Environmental Attitude to try to surpass the Price variable that has been so strong in the decision process.
The participants commented that Brazilian market does not recognize the potential of the renewable technologies, either in energy generation or in sustainable practices applied in products or solutions. The decision-making process is focused on the compliance of the technical specifications and price. During the attempts of sales focused on renewable energy technology products, the price difference weighted on the purchasing decision.
They have also stated that, as it happened with dry-type transformers and the federal regulation imposed forcing its usage on public buildings with high people circulation, one way to enhance the usage of renewable energy technologies products is to create

regulations for the application of these products and require that structural investments of any size are subjected to this regulation, making enforcement another variable to be considered.

5.1.2.2.2 QUESTION 2 - RESULTS AND OPINION OF STAGE 1

During the application process, the participants found that, in the Brazilian market, renewable energy technologies usage - when considering large projects/investments - is in its initial phase highly reliant on the government's mission to balance the energy matrix in Brazil. The costumers understand that after this initial process which includes governmental investment in solar and wind power, the final costumer's perception of the advantages of renewable energy technologies to the environment and sustainability, it would result in higher acceptance and sales of renewable energy technology products as well as higher availability of funding.

5.1.2.2.3 QUESTION 3 - EFFECTS OF THE RESULT ON THE ORGANIZATION

The participants have stated higher effects in learning and experimenting new ways to sell and understand the environmental around. They comment that they understand the importance of trying to influence the variable price with increasing environmental attitude and working with other companies and union for more funding availability for this type of technology application as well as some changes on the current standards enforcing the usage of renewable energy technologies in the investments to come.

5.1.2.2.4 QUESTION 4 - USE OF THE WORKING METHOD TO ADAPT TO NEW SITUATIONS.

The sales team has understood the opportunity not only to increase knowledge level about renewable energy technologies but to present these to the costumers, highlighting its environmental importance, benefits and sustainability, and even calculating investments' feedback index regarding energy saving x investment.
The process of discussion and reflection of the meeting 2 took about 1 hour and the participants were willingly to reflect on the results as much as they could to extract new questionings and opportunities. It was obvious that the interest in renewable energy technologies subject is high, and that there is a positive attitude towards it.

It also became very clear, during this process, that there are important variables that are not being considered on this research, that have the power to change the market. These are price, funding opportunities and law enforcement.

5.1.3 Discussion

By trying to apply the variables in the sales process of an organization that sells a large array of products, to all Brazil, that have renewable energy technologies version, following the conceptual model, it was possible to test how the final costumers reacted to the variables studied and if any of these variables were consistent to change the final costumer's decision. The learning sets were productive, taking a highly experienced team on the energy field with vast knowledge of the Brazilian market and renewable energy technologies, and putting this team to discuss, try and reflect on the difficulties and possibilities of the renewable energy technologies acceptance and usage in Brazil, the team has arrived at the main conclusion that, so far, the renewable energy technologies market in Brazil is in its start, and none of the variables tested can surpass the variable price on the decision process for purchasing.

The team has identified that, by governmental investment and funding of a new energy matrix in Brazil, the general knowledge of renewable energy technologies and its advantages will likely help on the development of these products in Brazil, not only by diminishing the importance of the variable price in the decision process, but also by boosting financial aid and funding to other renewable energy technologies processes.

Although high perceived environmental knowledge was not proven to influence environmental attitude, the learning set showed that the lack of perceived environmental knowledge can be very damaging for Environmental Attitude, in other words, Perceived Environmental Knowledge not always guarantees positive Environmental Attitude, but lack of Perceived Environmental Knowledge is very linked to bad Environmental Attitude.

Another issue noticed is the importance of enforcement by regulations. The government agencies, unions and organizations can work together for review in the current regulations aiming for enhancement of the usage of renewable energy technologies in structural investments - there is a current example, cited by the participants of the learning set, of change in regulation for distribution transformers that were enforced to comply with new regulations that changed the product to high-

efficiency level, so it is possible to see that there is a trend starting on government agencies as well - this possibility was considered amongst the participants of the learning sets as the more extreme and yet efficient way to change the current Brazilian market structure.

Looking at the organizational level, changes in the way of work of the participants were also another result of the learning set process, they have perceived opportunities to be explored to expand their sales, like providing the costumers some Environmental Knowledge and some knowledge about renewable energy technologies and how they can benefit the environment at the same time providing an attractive financial return in the medium to long term of the investment.

Table 67: Results of Action Learning Process

Group Learning	The organizational team that participated on this study have had the experience to participate in learning set sessions that provided open discussion of the problem faced. They have shared experiences, ideas and suggestions focusing on the research conceptual model and on the results of the application of changes proposed in their work environment. This has provided the team knowledge of a new method of problem solving which can be continuously used by them and passed to other organizational members and teams to improve their development process of new ideas and complex problem solving system.
Need for Funding	The group has learned that, considering the research question, one of the major constraints is the little governmental funding for this type of technology acceptance and usage. This came from the learning, also from the team, that, today, the major variable in Brazil that is holding back technological development is the price of the products.
Variable Price	The variable price, which was not considered on the conceptual model of this research, was discussed the major constraint for renewable technologies acceptance in Brazil. Considering this, the team has provided some different solutions that will be tested to try to diminish the strength of the price variable, such as directed funding for the investment in renewable energy technologies; gather with unions and governmental agencies to review the current standards, to a more environmental friendly version of the standards.
Increase of Environmental Knowledge	The team has also learned that the lack of environmental knowledge has negative effect on Environmental Attitude, therefore using means to provide customers with more Environmental Knowledge and knowledge of the renewable energy technologies products might help on the increase of sales of these products.

Perceived Environmental Knowledge X Environmental Attitude	The team has found the paradox of the variables Perceived Environmental Knowledge X Environmental Attitude. It was detected that the lack of Perceived Environmental Knowledge has a negative effect on Environmental Attitude, but the contrary is not always true, a high level of Perceived Environmental Knowledge does not necessarily lead to positive Environmental Attitude, and this is due to the price variable. So, the team understood that, it is important to promote environmental knowledge to its customers, but they are also aware that, if this action does not come connected to others to decrease the relevance of the variable price, such as special funding, financial incentives and review of the current standards, the investment rate on renewable energy technologies will continue to be low.

Source: The author.

5.2 Conclusion

On this chapter its was presented the action research process applied in this research. The application of the learning sets has helped the researcher understand and better position this research in practice. The learning sets were designed to explore the conceptual model, statistically tested in this paper, in action.

The researcher has applied two learning set sessions, which it was discussed the variables, considered in the conceptual model, to answer the research questions to what are the constraints that have been affecting the renewable energy technology acceptance in Brazil.

The learning sessions were applied in the top management of the sales group of the organization, and the discussions took place in the organization, which where lead by the researcher with open questions to enhance discussion and learning process among the participants.

The results, as presented, were very interesting. Some variables were added and the variables Environmental Attitude and Perceived Environmental Knowledge were widely explored to their strength in the purchasing decision process. It was even found a controversy among these same variables, as in which low Perceived Environmental Knowledge leads to negative impact on Environmental Attitude, but high Perceived Environmental Knowledge does not necessarily lead to positive impact on Environmental Attitude.

After the application of the proposed actions on learning set 1, the team came to put the high relevance of the variable price, not considered on the conceptual model, and have come up with proposals to diminish the relevance of this variable in the purchasing decision process, such as funding, increase of environmental knowledge to costumers and review of current standards.

The team that participated on the learning set left the second and final session with new ideas and sales strategies to be applied, to enhance the acceptance of renewable energy technologies. As for the researcher, after the application of the learning sets, it became clear that so far the research is aiming to a focus of behaviour based only on personal issues and knowledge, and did not consider external importance issues such as the price variable.

Further discussion on these results and the statistical results will be presented on the next chapter "Discussions" where all the data collected and reflection so far will be put together to understand the complexity of the problem statement as well as the need of encouragement of new ways of thinking to about renewable energy technology acceptance in Brazil.

Chapter 6: Scholar/Practitioner Journey

My practitioner journey, during all my DBA study period has been of constant learning and practice shaping on my managerial role.

When I first started this DBA program, I relied, for my managerial role, on my “feeling” for problems’ solution, as using acquired and development knowledge of experience. Although I had a business study background, I never considered using scientific method to solve a problem situation, which left some important questionings and reflections undone on my practice allowing a large room for mistakes.

By learning action-research methodology and applying it on small problems on each DBA module provided me the opportunity to better analyse and reflect upon problem statements on a structured way, and understanding that it is beneficial for both my managerial practice as well as for my researcher practice. On every DBA module, with every focused problem, practicing structured thinking, data collection, analysis, development of action plans, application and again on reflection, there were different challenges and development, growing the understanding that by using scientific methods on practice could provide me more complex view and understanding of the real problems presented and help me on the development of more assertive action plans.

When the DBA modules were done, it was time for the thesis. The first challenge was to picture a problem, a complex situation, how could this be explored and analysed on a thesis and if this would generate reliable and relevant knowledge both for the organization also for my researcher practice.

At the beginning, seemed to me that it would be an easier task considering that I would be working on a problem that I was living daily in my managerial practice, but after I started working on it, I realized that one of my biggest challenges on this thesis development process would be to separate my managerial and researcher roles, to not let my managerial and quick problem solution impulse to disturb my researcher behaviour.

The problem definition process took longer that I imagined, I had my mind oscillating from practice and research, I would think of a problem too scientific or too practical, I was having difficulty finding a problem, defining a statement where I presented a challenge that was possible to tackle for business and academy. At the end, I

understood that the complexity of problems on action research is different, the difficulty lies on the definition of important limits for the research while, during the managerial practice, a limitation of a problem statement is very hard to be kept, considering many aspects that influence daily the presented issue and can quickly change the managerial scenario. Keeping a scientific method when I was not only researching but also living the consequences of the problem on my practice, was tough, and it lasted during the whole research process.

The company that I work for is one of the major players in Brazil and Latin America on the electrical transmission and distribution field. It was a group of companies that work with the range of high, medium and low voltage equipments for all types of electrical transmission and distribution projects. My role in this company is International Business Manager, and I conduct all international businesses. When I started my DBA, the organization has provided me openness to use it on my studies, as long as I would be able to generate knowledge and actions that would help the organization, and so all the problems I explored in all modules and on the thesis, were based on this organization and my practice on it.

As international business manager, I work with other teams on a managerial level, such as national sales, national procurement, research and development, supply chain and engineering. The managerial work as a team consists on the development of new opportunities, strategies and technologies on the organization to keep it effective and profitable, focused on high-tech products to attend special needs markets.

6.1. Problem Statement Development

Over the past years we have been spotting the renewable energy technologies market, we have followed its development and growth on Europe and Asia and we acquired/developed technologies and products and assembled products set based on renewable energy technologies, sustainable and with high efficiency. After many sales effort, the market acceptance rate of these products in Brazil was very low, and the investment made was not getting its foreseen return. The major cause of this issue, as pointed by all the sales team also by other market players, was the high price practiced on these, generated from the applied raw material with special characteristics and the technology value. The expected payback of these products

was 40% higher than from the usual products and the market was not willing to accept this extra investment for protecting the environment. The result was a reduction of sales and market effort for these and back to the usual products line.

What we experienced later was a regression on the Brazilian market for renewable energy technologies mainly for its high costs and a development in Europe, Asia and North America. But over the last years, this market has been slowly taking some shape on Brazil, small investments started to appear and we saw a trend coming, the prices had reduced and the products were more efficient, but still there was a high resistant for this type of investment, and this is where the research question started coming, we wanted to understand what other variables were affecting the market other than prices, we wanted to understand what were the other drives that could impulse sales for this type of products, and one important thing we noticed was the knowledge level regarding environmental issues, we noticed, on our conversations with costumers, that the knowledge level of environmental issues was very low, people seemed to know what they were in a very simple manner, but most didn't believe that the scientific projection was wrong, that the climate change, for example, would only affect the population of generations to come.

On this scenario, I developed my problem statement, I wanted to understand the constraints that were delaying the acceptance and usage of renewable energy technologies in Brazil despite the price, and mostly, I wanted to explore the environmental knowledge level, if it were increased, would it impulse the market? This was a question that no one of the managerial team had and we agreed to look at it with a larger focus. Nowadays, myself and the managerial team are pleased with this work, the Brazilian market is following a high growing trend on the renewable energy technologies market, and this research has allowed us to prepare and develop different sales plans to explore this new trend, focusing now not only on price also focusing on environmental knowledge and impact.

6.2. Research Conceptualization

The time came to develop the conceptualization of the research. I had many questions to answer before start writing, questions like, what would be the theoretical basis for the research? What variables would I focus? What research philosophy to use? What methodology for data collection? There were also problems on the Brazilian market

regarding available information on it, there was very little data on renewable energy technologies' market focused on the organization's scope of supply, most of the data regarded power generation, not transmission and distribution. I felt it was important to explore the status of the market, to provide some basis for the exploration of the research question within the organization. There was no official information regarding the variables that affected the purchasing decision of the renewable energy technologies products, which lead me to the decision to ad and exploratory stage on my research, developing a conceptual model of variables to first be tested on the final costumers and get an idea of what was their drivers for making sustainable purchases and invest on environmental friendly products. The decision was made for mixed methodology research, where I was going to use the quantitative data collected from questionnaires applied on final costumers as information basis for the qualitative stage of the research, providing extra information for the reflective and problem solution stage on the learning sets. This decision lead me to a positivist philosophy on the research, where, by providing quantitative data for the qualitative stage, I narrowed the reflective stage into the variables tested on the conceptual model. This decision was made based on the idealization of the problem statement, where I was looking for variables focused on purchasing decision and environmental knowledge. Other variables appeared on the qualitative stage and were considered on the research, but the idea of providing the research with some focus was deliberated to drive the reflection stage into actions more effectively, with no previous information I felt that the team would look to other directions, so, based on previous market experience as well as on the time restraints that I had to deliver the research both for the university and for the organization, the research took a positivist philosophy background.

For the conceptual model development, the decision of theoretical background had to be made. I knew that I would consider environmental knowledge and purchasing decision, so the research for theoretical background took shape for this focus. I started to search for theories that could provide me with constructs and models that could be used on my conceptual model with my view of the variables to be explored. That was when I got in contact with the Technology Acceptance Model (Davis, 1989) known as TAM which seemed suitable to address the purchasing decision process for renewable energy technologies. The TAM model was a widely-used model with many variations, providing it testing on many different areas and proving its flexibility. The usage of the constructs Perceived ease of Use and Perceived Usefulness

demonstrated a simple yet in-depth way to explore costumer's decision for use a different technology, the idea explored on TAM (Davis, 1989) that this decision is based on its easiness and usefulness seemed a good starting basis, and the possibility to add other variables on these two variables made the model attractive, I added other variables that could complete the thought, such as moral and feelings and other variables I left unexplored to keep the narrowness of the research and that I felt were not very relevant, such as culture considering that culture, although it influences decisions, does not link directly when it comes to environmental issues, culture can be shaped by knowledge, and since I would look at environmental knowledge the variable culture seemed irrelevant for this research. Another important issue to add regards the version of TAM (Davis, 1989) I used. I decided to use the first version of TAM after analysing many other versions, the basis of the model regarding Perceived Ease of Use and Perceived Usefulness kept the same, and since I could use other variables to explore within Perceived Ease of Use and Perceived Usefulness, I came to the decision that the first version was reliable for this research.

After the decision for TAM, I started considering environmental variables I could add on my conceptual models, after looking at many, I decided for the New Environmental Paradigm (Dunlap and Van Liere, 1978) known as NEP for basis. The NEP, although it is also not a new scale, it is still widely used for environmental research for testing ecological behaviour, situational and emotional variants. The model has suffered variations over time for specific purposes, but for the overall purpose as ecological behaviour, it was maintained. To add an important and missing analysis that NEP did not provide, I added the variable based on Ecological Conscious Consumer Behaviour (Roberts, 1996) which considered consuming behaviour for ecological products, consisting of an important part of this investigation, the understanding of what leads the consumers to choose for ecological products, considering an individual level.

The choice for TAM model and NEP scale were the basis for the development of the conceptual model. The next stage consisted on the first stage of research application. At this point, I fell it is important to add a personal life note. At the time for starting sending the questionnaires, which I chose to be sent by e-mail to the population, I was at the third stage of my pregnancy, and by the end of the seventh month, I was diagnosed with oligohydramnios, which is the premature loss of amniotic liquid. At this stage I was hospitalized until I gave birth, for over a month, and while I was hospitalized, I sent the research invitations e-mails. After my baby was born, for a

period of 1 month, my research was on stand-by, I would just check if I was getting response for the questionnaires, but all the process was on hold due to baby care that had to be extra due to the baby's weak condition caused by the oligohydramnios. By the time that my baby passed 1 month from birth, I had enough responses to start working on the statistical analysis of the questionnaires. The information generated on the questionnaire was later presented to the managerial team participating on the learning sets.

The qualitative stage of the research was developed by the usage of learning sets, these were conducted by using reflective questions about the research problem, to engage discussion among the participants towards action to be taken. On important thing to mention, on a practitioner level, was the difficulty encountered during this stage to allow the discussions run free among the participants, I presented the conceptual model and data collected and started posing the questions, but I did not intervene, even when it was very hard, on the answers and reflection process. I believe that this is the most challenging stage on being a practitioner, when you must step out of the process and just listen, let the team reflect, even though you are also a part of the problem and wishes to actively contribute.

The learning sets generated a solid action plan, regarding marketing investment on environmental knowledge. Despite the common knowledge about the variable prices on the costumer decision, the researcher pointed that there is an interesting correlation regarding environmental knowledge and the willingness to pay higher prices for renewable energy technologies' products, leading the team to an action plan composed of many different items, such as the development of specific financing line of credit, working with governmental institutions for a reduction of taxes campaign and developing a marketing strategy sustained on educating costumers of the environmental issues and their impact on their pockets and their lives.

By the end of the research, I am pleased with the result, right now we are working towards increasing sales of renewable energy technologies' based products. The positive results of the efforts make like partnerships of utilities to connect on-grid sun power generation on establishments, from houses, commercial establishments, buildings and factories, allowing the final costumers to use power generated energy while there is sun light and automatically changing to the electrical grid when sun light is over, reducing from the final electricity bill around 75% of total amount, making the investment on solar panels attractive with a 5 years payback followed 20 years of

financial gain, despite that this power generated on such low cost can sustain other important environmental investments, such as electrical cars and all types of electrical equipments. We are also making a special marketing effort on organizations that work only with renewable energy generation, such as wind, water and sun power generation, developing a special line of products, hi-tech developed under strict engineering and quality standards, high-efficiency electrical transmission and distribution products, which provide the organization a larger profit margin and puts it into a high technological level market adding financial and market value to the company.

6.3. Reflections

This research has brought me an important experience, teaching me how to be more methodical on my job, teaching me the importance of questioning and reflecting before making decisions, using not only my gut as tool, but also my knowledge, experience and capability of reflective thinking on my daily basis. I have changed the way that I work, the way the I think even on my personal life, positively, and I have also gathered a huge taste for research, which I intend to keep on doing from now on.

Ever since the beginning for the research process, there have been many challenges, such as defining a research question and a theoretical basis. I have citations of my struggles on my journey, such as “I have started interested in complex adaptive systems, to a complex problem, but adopted TAM as theoretical basis to understand behaviour and adaptation to change regarding RETs” (Minato,2015). The development of the research proposal followed an unforeseen path for me, as I intended, initially, to tackle renewable energy technologies (RETs) slow entry on the Brazilian market by difficulty of adaptability to new situations. The TAM model looks at this perceived usefulness and perceived ease of use, where interesting questions regarding the acceptance of a new model might of a reflex of adaptability. At the initial stages of my research I did not understand that, but now I see a relevant connection on behavioural research.

Next important development on my research regarded mixed methodology on an action research strategy research. It was hard for me to understand how this methodological choice could work with this research strategy. While I was looking for material that could justify this, I noted “how to apply mixed methodology on a research

strategy that is so qualitative driven? My supervisor has been affirming that its ok, even sent me some published material on this, but I am very, very insecure" (Minato, 2016) another important note I made before my presentation "I am afraid that I won't be able to defend mixed methodology on action research, it is confusing even when I read my developed material and confusing on my head" (Minato, 2017). I have studied and analysed very hard this situation, even on my presentation there were some inconsistencies which my supervisor and examiners helped me understanding; after some extensive studying and reflection, now I can understand how mixed methodology can be used on action research strategy, some materials have guided me on this process, and I see how we can do positivist research with mixed methodology and action research strategy, which is presented and explained on the previous chapters. I have always been a more positivist person, I tend to look at the reality objectively specially on my work, I have come to understand the importance of critical thinking based on data and reflection to make my decisions, and by the end of this research, I see myself present on it, my identity as a manager and research and self, on all this research, from its conceptualization, to its application and reflections.

This research has also generated some important contributions looking at an organizational and academic side, which will be discussed on the next chapter, here I was to finish this chapter with important personal and life changing contributions that going to through this research process has given me.

"I can see important personal, attitudinal and critical changes on myself, I feel slower on my decision-making process for complex situations, but my level of mistakes has also diminished; my team and my directors have come to understand my points, by my mum said that it is not them who changed, it is me who is different" (Minato, 2107). This was a note from the beginning of this year on my journey, I made this note after perceiving higher productivity from myself and my team, and also I was experiencing changes on my discussions and proposals sent to the directors, I could not understand if they had softened or what changed, so I commented with my mother and she told me that the change was no me, not on the others, it was that I was more flexible, patient and argumentative on a very objective level. I had evolved from interpretational and experience based, which remain under certain circumstances, to a more critical and objective ways to defend my ideas, and I was feeling it changing my life, making my job easier and my personal life easier as well, this was one of the major personal changes I experienced during this research process, personal development.

Chapter 7: Discussion and Conclusions

From the conceptualization of this research, the focus was to understand what are the main constraints that have been slowing the process of renewable energy technologies acceptance and usage in Brazil. This research question has been selected to understand the reasons for such a slow process on substituting and adopting renewable energy technologies and its products in Brazil. If one looks at the Brazilian energy matrix which has its base on hydropower (Guerra, et. al, 2015) it becomes possible to understand its fragility considering climate changes, making the energy price in Brazil suffer a great deal of oscillation amongst periods. The need to adoption a larger range of renewable energy technologies, not only in generation, but transmission, distribution and usage of energy becomes clear, specially with demand increase every year (Guerra, et. al, 2015). Considering that this is a critical point to the Brazilian energy market, this research focused on mapping the constraints and, during the learning sets, develop ideas to overcome these constraints. This research question is based on the research gap existent that there are no reviews focusing on the constraints for adoption of renewable energy technologies in Brazil and no action research applied to understand how the constraints detected could be overcome.

For the development of the conceptual model of this research the author has chosen a mixed methodology using quantitative data collection and action research (Coghlan, 2011) based on using Technology Acceptance Model (TAM) (Davis, 1989) and Environmental Attitude (Bohlen and Diamantopoulos, 1993) and its variables for the conceptual model development. After the first part of the research is conducted, which is, the quantitative data collection, the researcher joined the leaders of the sales team to conduct the action research part, based on the usage of learning sets, to test the conceptual model created and statistically tested and develop action plans do explore the constraints that have been confirmed.

7.1 Objectives

The researcher has established in the first chapter of this research that the main objective of this research is to map the major constraints that have been keeping final users to adopt renewable energy technologies. The development of the main objective

was its division in little objectives to be achieved to achieve the main objective, as following table:

Table 68: Research Objectives

Objectives
To develop a conceptual model grounded on existent reliable theory that will account for the research domain required.
To explore the constructs of the conceptual model.
To analyse the data collected by the exploration of the environment using the proper analytical tools
To apply the constraints found in an organization of the energy field, by learning sets.
To provide market players with the elements that have been retaining the renewable energy technologies acceptance process in Brazil.
To provide suggestions for the development of the renewable energy technologies in Brazil based on the research results.
To open more research questions and possibilities based on the results and limitations of this research.

Source: The author.

By the end of this research, the author is pleased to state that all the objectives established have been achieved: a reliable conceptual model was built based on relevant literature that could provide the researcher with basis for the development of the quantitative and qualitative - as action research - phases, which have allowed the researcher to collect data and work in an environment with a team of professionals that could understand the data, interpret the problem, develop an action plan and analyse its results, which would then confirm or refute the conceptual model and quantitative data collected, providing the author with answers to the research questions and suggestions of actions to be taken and new aspects to be explored in futures research.

7.2 Discussion of the Quantitative Study

The objective of this research is to find the constraints for renewable energy technologies acceptance in Brazil. For achieving this objective, the researcher has, adopted a mixed methodology based on quantitative data collection followed by qualitative dada collection using action research process.

For the quantitative study, the researcher developed a conceptual model and tested it on a Brazilian population with the following characteristics: living on the south and southeast regions of Brazil, school level being graduation for a university in any course, middle-upper and upper class; by the application of a questionnaire based on each variable and hypothesis of the conceptual model and their structure proven on other researches, which was presented and discussed on Chapter 3.

The data collection process on the quantitative phase was applied through invitations by email to the studied population. People who were interested answered the questionnaire on total, which have revealed some changes on the initial conceptual model idealized by the researcher.

Based on the factor analysis research, the changes on the conceptual model where substantial: the variables Perceived Consumer Effectiveness and Actual Use where removed from the conceptual model; variable Perceived Norm was split in two factors, Feelings and Morality; variable Environmental Perceived Knowledge was split into the factors Pollution and Depletion of Natural Resources and Environmental Consequences; the variable Environmental Concern was split in the factors Environmental Balance, Environmental Exploitation and Environmental Control; finally the variable Environmental Attitude was split into the factors Personal Environmental Attitude, Understated Environmental Attitude, Legal/Financial Environmental Attitude and Political Environmental Attitude. For a picture of the conceptual model after the factor analysis see (Figure 19). When looking at this new conceptual model and seeing factors like Feelings, Morality, Personal Environmental Attitude and others, it is possible to see how the conceptual model has shifted into more specific factors, which later in the research as contributed to a more assertive level of knowledge collection and discussion, specially in the Chapter 4 Action Research.

Back to statistics, after the Factor Analysis the researcher conducted a Multiple Regression and Multicollinearity Test to find positive and negative relationships amongst the variables, one and its many relations.

After analysis, the researcher has managed to prove the conceptual model (Figure 16) consistent of the hypothesis 1, 2, 3, 4, 6 and 9. All the other variables where removed from this conceptual model's version, due to negative relations or lack of relevancy the research.

7.3. Discussion of the Qualitative Study

The next step the researcher followed was to test this conceptual model on practice, applying action learning, or learning in action using mixed methodology (Martí, 2015). The researcher following the steps proposed by Greenwood & Levin (1998) and William (2001) for the development of learning set sessions designed to engage the participants in analysis, discussion, action and discussion once again, to better understand the environment and work on the presented constraints on this environment on the attempt of changing it for the best.

Following the work of Revans (1985) learning sets are a great tool to provide the breaking of learning barriers, creating opportunities to examine previous experiences and combat personal defensive mechanisms against change. The learning process was focused on cooperative learning and problem-based learning and the learning sets were the reflective process of the action learning of the research.

The researcher structured the learning sets as to ensure success, based on Revan's learning cycle (1980) the learning set was developed as structure, application, discussion, reflection and results.

For this research, the researcher has developed an action learning process composed of 2 learning sets, planned and designed to attend the needs of this research and of the organization that is participating on the research. During the planning period, the researcher began by choosing the organization that would participated on the learning set, the professionals that would be part and finally the products that would be analysed. The researcher chose an organization that is a national provider of electricity transmission and distribution products, that operates in all regions of Brazil and in many other countries, which counted with a set of professions which had a deep knowledge of the Brazilian renewable energy technologies market and, also, from other developed and under development countries in the Americas and Europe. Finally, the set of products chosen were the set of renewable energy technologies that the organization provided and that the professionals had knowledge about, technologies that could provide new and different opportunities to the organization.

The first learning set took place on January 27th, 2016, and the second learning set took place on March 21st, 2016. The time gap among the learning set was chosen considering the average time for a sale placement, from offering, negotiating and

receiving the purchase order from the costumer, for the products sold by this organization.

The development of the questions to be applied on both learning sets followed the results presented on the quantitative research also based on Mumford (1997) and his encouragement of ideas model, encouragement expression of thoughts, ideas, personal experiences and discussions, all focused on the research question.

On the first learning set, the team presented itself, initially, unmotivated to discuss renewable energy technologies in the sense that these are technologies that are yet new in the market and unexplored. As the questions were posed and the participation was encouraged, the participants expressed their difficulty in selling renewable energy technologies due to its cost and long feedback period. They presented that there is no financial aid for this kind of product and the feedback period was larger than 10 years, making the investment, most of the times, impracticable.

After this first feedback from the participants, the researcher presented the conceptual model tested on the quantitative phase of the research and the team discussed if there was possibility of applying these ideas on the real market, and the first session has ended with the commitment of the participants to try to work harder on sales of renewable energy technologies, not only presenting their usual financial arguments, but also working on arguments of environmental consequences and improvements that renewable energy technologies can provide.

After the first session, time passed until March 21st, when the second session was scheduled. During the second session, the participants came with very interesting information regarding the application of the conceptual model during their sales processes. The interesting part is that they understood that people with a little knowledge of environmental issues - a large part of the population - were concerned on their personal level about it, but not concerned to the level that they would by renewable energy technologies equipment's considering the price difference. When the researcher asked about what would the costumers consider, in their case, a suitable price difference that would allow them to invest, the answer was until 10%, they also commented that this is what it is forecasted for today, that the payback time is reaching 10 years, with the improvement of technologies they believe that this scenario can change. What could be done now, they believe, to improve sales of renewable energy technologies, is funding, like governmental funding to help pay for the high costs of adopting the technology.

Considering these comments, the researcher understands that, per the statistical results, all the factors of environmental attitude are very correlated to attitude towards use, but for the factors personal environmental attitude and legal/financial environmental attitude, the correlation with attitude towards use is positive, whereas understated environmental attitude and political environmental attitude, the relationship with attitude towards use pulls for the negative side. This is confirmed by the results of statistical analysis, were t-statistic for both understated environmental attitude and political environmental attitude is negative, concluding that the idea for positive relationship is directly linked to the factors personal environmental attitude and financial environmental attitude, in other words, the individual has to have a positive environmental and the prices and legal issues of renewable energy technologies have to provide a motivational environment so that the individual will easier embrace renewable energy technologies.

When the researcher asked about the other two variables perceived usefulness and perceived ease of use, the participants stated that renewable energy technologies are both easier to use, easier to install and operate, which follows confirms the results of the statistical analysis for Perceived Usefulness and Perceived Ease of Use and Attitude Towards Use.

Concluding this reflection, what the researcher managed to prove here is that, for the variables Perceived Usefulness and Perceived Ease of Use, there is complete correlation with Attitude Towards Use and the products are prepared to achieve the requirement, users already consider renewable energy technologies useful and ease to use. As for the variable Environmental Attitude, split into factors, the factors Personal Environmental Attitude and Legal/Financial Environmental Attitude are positively correlated to Attitude Towards Use, in other words, if there is a level of personal knowledge and concern about the environment and if the current scenario provides reliable financial/legal programs or environment, it increases highly the possibility of adoption of renewable energy technologies. As for the factors Understated Environmental Attitude and Political Environmental Attitude, if the final user is on an environmental where there are low levels of Understated Environmental Attitude and Political Environmental Attitude, there is a higher chance that the final user will adopt renewable energy technologies.

This analysis allows the researcher to conclude that the constraints that have been slowing down the renewable energy technologies adoption process in Brazil are the

price difference between renewable energy technologies based products and regular energy technologies based products, lack of financial aid and programs to help the investors to adopt these technologies and knowledge about environmental issues, environmental impacts and renewable energy. These items present actionable knowledge for organizations, government and society. Organizations now have mapped that the main issue regards different price levels and environmental knowledge, which can lead the organization strategy to enhance knowledge spreading campaigns regarding the benefits of renewable energy technologies and their importance on environmental problems we are facing; these elements also provide organizations the importance of funding strategies towards government and institutions, showing that these can reduce the price levels and increase competition level with non-renewable energy technologies' based products.

7.4. Summary

The main research question, or research gap, of mapping constraints that are holding full adoption of renewable energy technologies in Brazil has been explored and answered, after this process we now know that, in the Brazilian market, price, lack of financial aid and environmental knowledge, in this order, are the main constraints on enhancing renewable energy technologies adoption in Brazil.

The objectives of this research have been achieved; the researcher has built a conceptual model based on existent reliable theory and used it to explore the environment by using related constructs; the data gathered was used as basis for the application of an Action Research in an organizational team who faces de dilemma of selling renewable energy technologies products; suggestions on the scenarios was made and after the application via learning sets, the researcher and the participants learned from the experiment about these constraints and added some measures that would help dealing with these constraints, and finally the researcher managed open path for questionings and future researches based on this assignment.

For achieving all these objectives and managing to answer the research question, the researcher has using theories based on Attitude study, such as Theory of Reasoned Behaviour (TRA) (Fishbein and Arjen, 1975), Theory of Planned Behaviour (TPB) (Ajzen, 1985) and Technology Acceptance Model (Davis, 1985). These were the first part of the theory analysed for the conceptual model, the researcher then added some

Environmental Attitude Theory (Kaiser, 1996) and the scales of New Environmental Paradigm (NEP) (Dunlap and Van Liere, 1978) and Ecologically Conscious Consumer Behaviour (ECCB) (Roberts, 1996) as a compliment on the TAM model to help on the exploration of both technological acceptance and environmental attitude.

After the literature and its constructs were reviewed, the researcher gathered data and conducted a statistical analysis to remove from the conceptual model constraints that would not apply on the research. Finally, after statistical analysis, has conducted an Action Research process within an organization of the field and its team. Two learning sets were conducted for analysis of the statistical results, plan of action, and analysis again of results, with further suggestions and plan of action.

The researcher managed to answer the research question and objectives and the organization that adopted the Action Research process has learned not only how to deal with this research's problem, but they have learned a tool that will help the entire organization on tagging different problems in the future.

7.5. Contributions of The Research

In the beginning of this research, the researcher developed a conceptual model based the theories of reasoned action (TRA) (Fishbein and Ajzen, 1975), planned behaviour (TPB) (Ajzen, 1988) which provided basis for using the Technology Acceptance Model (Davis, 1985) as the base model for the research's conceptual model; but the researcher also aimed to add to the TAM model variables that could adapt its exploration power to environmental attitudes, therefore based on the concepts of New Environmental Paradigm (NEP) (Dunlap and Van Liere, 1978) and Ecologically Conscious Consumer Behaviour scale (ECCB) (Roberts, 1996), the researcher added to TAM model the variables Environmental Attitude, based on the variable Environmental Concern which is based on the variable Environmental Perceived Knowledge.

The constructs already tested and proved of these models were used to develop the quantitative questionnaire applied in the population of south and southeast of Brazil, with a minimum income and educational level, so the researcher could look at people that have the financial means and knowledge to adopt renewable energy technologies in their endeavours.

After the statistical analysis, this same conceptual model was tested in an action research, consisting of 2 learning set sessions and the explorations of all the variables consistent in the conceptual model.

Testing a new conceptual model on action research, adopting a stage of quantitative data collection and analysis and using these on the next cycle of the research, having results that proved the conceptual model as viable to the analysis required it is the major theoretical contribution of this research.

There were other contributions as well, such as the exploring of a real problem that has been faced by many organizations and people in Brazil, which is mapping the constraints for adoption of renewable energy technologies, which can be resumed in environmental knowledge and financial issues (price difference). These were explored not only on the quantitative process of the research but also on the action learning process, alternatives were tested to prove these constraints, which now allows the industry to change their strategies, by preparing their environmental knowledge level of their sales teams, finding financial support or even making collective effort to found an institution that could provide financial support, fighting against political regulations which keeps the taxes for these products very high, slowing the technological advancement level on the country and not supporting the technological advancement of the local organizations by protecting them from international competition.

Looking at the practitioner aspect, this research has provided many contribution on the managerial side. After me and my colleagues have passed through this research experience, the action learning experience has led me and the team to enhance our questioning abilities before taking into action. The learning sets have thought the team to critically analyse situations and hold back the usual impulsive decision that managers have based only on their experience/feeling. Going through structured critical analysis meetings and planning actions has made the daily managerial practice a little more as an analytical process. The team of managers now look at issues and force themselves to question realities that were once taken for granted, seen as normal procedures, and put them into check looking for different perspectives and ways to do things.

This research specifically has led to the development of a business strategy specific for the renewable energy technologies' marked exploration. The team has adopted actions such as working on specific marketing material focused on teaching the importance of adopting renewable energy based products, focusing on environmental

and financial gains, such as looking at generated carbon emission for transformers that are insulated with mineral oil against saved carbon emission on transformers that are insulated with biodegradable oil. Another important step taken by the company was based on the understanding of the importance of knowledge versus financial possibilities for final costumers, leading the organization to get into the solar generation energy market. By stablishing partnerships with financial institutions and focusing on sustainable sales, the organization is not selling and installing solar energy generation equipments, financing them to the costumers so that the investment can be paid with the money saved from the reduced energy bill and teaching final costumers how to better use the natural resources on their daily lives. This new strategy goes all the way through the organization, at this moment we are under negotiation with other companies to invest on a solar plates and inverters factory to be based in Brazil, for an aggressive sales strategy on the Brazilian and South America market of solar energy generation.

7.6. Limitations and Suggestion for Future Researches

This research is limited to a restrict market, area and population in Brazil. There is a very clear gap here to consider if this researcher would be applied in a different market, area or population there could be significant changes on the results, considering the great different amongst regions in Brazil? Another interesting question is, if this research would be applied on people with low income, what would be the weight difference amongst price and environmental attitude?

Considering the conceptual model developed and tested, it is the researcher's understanding that the greatest limitation of this research was not to add the financial variable in the conceptual model, after all, during the action learning, it became quite clear that the largest constraint was the current price of renewable energy technologies. Despite that, the researcher sees also a bright side on not adding the variable price, focusing its conceptual model in installing and operating the technology as well as on personal attitude about the environment. One interesting gap to be looked at is, if this same research is conducted again but, this time, the variable price is added on the conceptual model, would the result be the same? Or would it be different considering the weight of the variable price amongst the others present on the conceptual model?

Another gap found in this research is, if the renewable energy technologies were more competitive on the market, what share of the market would it take? How strong is the market's environmental attitude in such situation?

There are many different questions that can be asked to generate new researches based on this presented one, this research closes a gap in the literature considering the mapping of the constraints for renewable energy technologies adoption in Brazil, but it opens many other ones to be explored.

It is also important to comment on the limitations that the usage of the positivist research philosophy adopted by the researcher has on the final work. By choosing a mixed methodology to test the conceptual model, using variables with existent constructs and adding the generated data into the qualitative study, the researcher limits this action research on total collaborative pure action research. The participative stage of this research was applied accordingly to the developed conceptual model, using the constructs of theories based on purchasing behaviour analysis focused on technology and environment, leaving behind other important aspects that can play important roles on the decision-making process such as personal values, cultural factors, societal pressure and opinion and so on. This research focuses on technological and environmental issues, considered with high relevance for this specific scope of products, but due to lack of resources, leaves other factors unexplored.

This research also helps on the practical side, by mapping the constraints under a certain situation, it provides managers with a set of constraints that can be used for the development of a strategy focused on enhancing renewable energy technologies sales in Brazil, strategies that will not be based on price only, but will be based on the many advantages that renewable energy technologies can provide, promoting these advantages, spreading knowledge and fighting with governmental or private institutions for financial aid programs to enhance the use of these technologies.

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APPENDICES

APENDIX 1: Invitation to participate on quantitative questionnaire.

Research Invitation

You are being invited to participate in a research study. Before you decide whether to participate, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and feel free to ask us if you would like more information or if there is anything that you do not understand. Please also feel free to discuss this with your friends, relatives and GP if you wish. We would like to stress that you do not have to accept this invitation and should only agree to take part if you want to.

Research Title: "Constraints to a full adoption of renewable energy: An empirical assessment"

Study Purpose: The purpose of this research is to detect the constraints that have been preventing Brazil's full adoption of renewable energy technologies and the willingness to pay for renewable energy technologies.

We would like to invite you to participate in this study if you fit all the inclusion considerations for the sample to be analysed. The criteria used for the selection of the participants of this research are:
For the qualitative research: individuals must have a high level of influence in the Brazilian energy market. Must occupy positions such as in the government congress, ministry, CEO of private institutions and public institutions that operate in the area.
For quantitative research: individuals who reside in the states of south and southeast of Brazil, economically active, holding a university diploma, income of 09 minimum wages or higher, who are active in social medias.
By accepting to participate in this study, you will be considered as one of the representatives of the entire population, which is being studied.
If you are participating on the qualitative stage of this research, the interview should take around 30-45 minutes of your time. The data will be collected by the researcher during this interview in notes, and it will then be analysed for the research purposes. There is no need to provide any personal information to the researcher. The participant can decline to answer any questions posed by the researcher without stressing the reasons. The data collected will be treated with confidentiality, remaining only on the researcher´s personal laptop and hard drive protected by personal password.
If you are participating on the quantitative stage of this research, the questionnaire should take around 15-25 minutes of your time. The data will be collected by the researcher during this questionnaire online, and it will then be analysed for the research purposes. There is no need to provide any personal information to the researcher. The participant can decline to answer any questions posed by the researcher without stressing the reasons. The data collected will be treated with confidentiality, remaining only on the researcher´s personal laptop and hard drive, protected by personal password.
The participation in this study is voluntary, you can stop participating any time you find fit and do not need to stress the reasons why you have stopped participating. Also, you can decline this invitation for participation without stressing the issues that you have considered to do so.
We would like to stress that this study is of minimum risks areas such as legal, physiological, relationship, economic/professional and any other, which means that the probability and magnitude of harm and discomfort is not greater in and of themselves than those ordinarily encountered in daily life. The confidentiality of the participants is secured all the time minimizing all the risks. Still, if during the research process, you feel at professional, personal, economic, relationship or exposed to any other risk, be assured that the information gathered is fully confidential, and that you are free to withdraw from this research at any time.
Mrs. Francielli Minato, MIB, and current student of the Doctorate program in Business Administration in the University of Liverpool is conducting this research. Dr. Eleanna Kafeza, member of the University of Liverpool, is supervising this study.
This research will offer no prizes or benefits for its participants, also there are no physical or moral risks in participating of this study.
If you do not fit the inclusion criteria described above, please disregard this invitation.
If you are unhappy, or if there is a problem, please feel free to let us know by contacting Mrs. Francielli Minato, phone number +55 43 91412960 or e-mail francielli.minato@online.liverpool.ac.uk, and we will try to help. If you remain unhappy or have a complaint which you feel you cannot come to us with then you should contact the Research Governance Officer at ethics@liv.ac.uk. When contacting the Research Governance Officer, please provide details of the name or description of the study (so that it can be identified), the researcher(s) involved, and the details of the complaint you wish to make.
You can also look for the University's Research Participant Advocate in the e-mail liverpoolethics@ohecampus.com for further information.
The data collected in this study will be handled as fully confidential, in no moment any names or identifications will be required and the researcher will have access to the final study once it has been fully approved by the University of Liverpool. In case that you want a electronic copy of the final thesis, please request Mrs. Francielli Minato at francielli.minato@online.liverpool.ac.uk. This study is planned to be due by December, 2015.
For further information, please do not hesitate to contact Mrs. Francielli Minato at the phone number and email provided.

Cornélio Procópio, February 7th, 2015.

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Demographics

Please answer the following questions according to your current status.

1* Please indicate your gender:

- [ ] Male
- [ ] Female

2* Please indicate your age:

- [ ] Under 30 years.
- [ ] From 30-40 years.
- [ ] From 41-50 years.
- [ ] Over 50 years.

3* Please indicate your nationality:

4* Please indicate the province you currently live in

- [ ] Acre
- [ ] Alagoas
- [ ] Amapá
- [ ] Amazonas
- [ ] Bahia
- [ ] Ceará
- [ ] Distrito Federal
- [ ] Espírito Santo
- [ ] Goiás
- [ ] Maranhão
- [ ] Mato Grosso
- [ ] Mato Grosso do Sul
- [ ] Minas Gerais
- [ ] Pará
- [ ] Paraíba
- [ ] Paraná
- [ ] Pernambuco
- [ ] Piauí
- [ ] Rio de Janeiro
- [ ] Rio Grande do Norte
- [ ] Rio Grande do Sul
- [ ] Rondônia
- [ ] Roraima
- [ ] Santa Catarina
- [ ] São Paulo
- [ ] Sergipe
- [ ] Tocantins

5* Please indicate your education level:

- [ ] Elementary school Incomplete
- [ ] Elementary school Complete
- [ ] High-school Incomplete
- [ ] High-school Complete
- [ ] College Incomplete
- [ ] College Complete
- [ ] Post-graduation Incomplete
- [ ] Post-graduation Complete

6* Please indicate your job title:

7* Please indicate how long you have been in your present position:

- [ ] Less than a year
- [ ] 1-3 years
- [ ] 3-5 years
- [ ] 5-10 years
- [ ] 10-20 years
- [ ] More than 20 years

8* Please indicate your income level.

- [ ] Lower than 2 minimum wages
- [ ] From 2 to 3 minimum wages
- [ ] From 3 to 9 minimum wages
- [ ] From 9 to 12 minimum wages
- [ ] More than 12 minimum wages

SECTION 1: PERSONAL NORM

In answering the following questions, please focus on your personal values and indicate the extent of your agreement or disagreement in each of the following statements.
Please consider as renewable energy technology all technologies that are powered by renewable energy resources.

9* It would be against my moral principles not to use renewable energy technologies in my environment.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

10* Not using renewable energy technologies in my environment would go against my principles.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

11* I have a moral obligation to use renewable energy technologies in my environment.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

12* I would feel guilty about not using renewable energy technologies in my environment.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

13* I feel obliged to use renewable energy technologies in my environment.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

SECTION 2: IMAGE

In answering the following questions, please focus on your daily activities and indicate the extent of your agreement or disagreement in each of the following statements.
Please consider as renewable energy technology all technologies that are powered by renewable energy resources.

14* Using renewable energy technologies improves my image with my social environment.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

15* People in my social environment who use renewable energy technologies have more prestige than those who do not.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

16* Using renewable energy technologies in my social environment improves others recognition of me.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

17* When I use renewable energy technologies, the people of my social environment respect me.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

18* When I use renewable energy technologies my superiors praise me.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

SECTION 3: ENJOYMENT

In answering the following questions, please focus on your enjoyment and indicate the extent of your agreement or disagreement in each of the following statements.
Please consider as renewable energy technology all technologies that are powered by renewable energy resources.

19* I enjoy using renewable energy technologies in my environment.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

20* I enjoy helping others by using renewable energy technologies.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

21* It feels good to use renewable energy technologies in my environment.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

22* Using renewable energy technologies in my environment gives me pleasure.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

SECTION 4: PERCEIVED USEFULNESS

In answering the following questions, please focus on your daily activities and indicate the extent of your agreement or disagreement in each of the following statements.
Please consider as renewable energy technology all technologies that are powered by renewable energy resources.

23* Using renewable energy technologies in my job would enable me to accomplish tasks more quickly.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

24* Using renewable energy technologies would improve my job performance.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

25* Using renewable energy technologies would increase my productivity.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

26* Using renewable energy technologies would enhance my effectiveness on the job.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

27* Using renewable energy technologies would make it easier to do my job.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

28* I would find renewable energy technologies useful in my job.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

SECTION 5: PERCEIVED CONSUMER EFFECTIVENESS

In answering the following questions, please focus on your daily activities and indicate the extent of your agreement or disagreement in each of the following statements.

29* It is worthless for the individual consumer to do anything about pollution.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

30* When I buy products, I try to consider how my use of them will affect the environment and other consumers.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

31* Since one person cannot have any effect upon pollution and natural resource problems, it doesn't make any difference what I do.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

32* Each consumer's behavior can have a positive effect on society by purchasing products sold by socially responsible companies.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

SECTION 6: PERCEIVED EASE OF USE

In answering the following questions, please focus on your daily activities and indicate the extent of your agreement or disagreement in each of the following statements.
Please consider as renewable energy technology all technologies that are powered by renewable energy resources.

33* Learning to operate renewable energy technologies is easy for me.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

34* I would find it easy to get renewable energy technologies to do what I want to do.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

35* My interaction with renewable energy technologies is easy to understand.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

36* I would find renewable energy technologies flexible to interact with.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

37* It would be easy for me to become skilful at using renewable energy technologies.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

38* I would find renewable energy technologies easy to use.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

SECTION 7: ENVIRONMENTAL PERCEIVED KNOWLEDGE

In answering the following questions, please focus on your personal knowledge and indicate the extent of your level or knowledge in each of the following statements.

39* Acid Rain.

	1 Know nothing about	2 Know very little about	3 Know little about	4 Neutral	5 Know a bit about	6 Know quite a bit about	7 Know a lot about
Knowledge Level	☐	☐	☐	☐	☐	☐	☐

40* Sea/River pollution.

	1 Know nothing about	2 Know very little about	3 Know little about	4 Neutral	5 Know a bit about	6 Know quite a bit about	7 Know a lot about
Knowledge Level	☐	☐	☐	☐	☐	☐	☐

41* Air pollution from power stations.

	1 Know nothing about	2 Know very little about	3 Know little about	4 Neutral	5 Know a bit about	6 Know quite a bit about	7 Know a lot about
Knowledge Level	☐	☐	☐	☐	☐	☐	☐

42* Global warming.

	1 Know nothing about	2 Know very little about	3 Know little about	4 Neutral	5 Know a bit about	6 Know quite a bit about	7 Know a lot about
Knowledge Level	☐	☐	☐	☐	☐	☐	☐

43* Ozone layer depletion.

	1 Know nothing about	2 Know very little about	3 Know little about	4 Neutral	5 Know a bit about	6 Know quite a bit about	7 Know a lot about
Knowledge Level	☐	☐	☐	☐	☐	☐	☐

44* Pollution of drinking water.

	1 Know nothing about	2 Know very little about	3 Know little about	4 Neutral	5 Know a bit about	6 Know quite a bit about	7 Know a lot about
Knowledge Level	☐	☐	☐	☐	☐	☐	☐

45* Pollution from pesticides/insecticides.

	1 Know nothing about	2 Know very little about	3 Know little about	4 Neutral	5 Know a bit about	6 Know quite a bit about	7 Know a lot about
Knowledge Level	☐	☐	☐	☐	☐	☐	☐

46* Destruction of the rain forests.

	1 Know nothing about	2 Know very little about	3 Know little about	4 Neutral	5 Know a bit about	6 Know quite a bit about	7 Know a lot about
Knowledge Level	☐	☐	☐	☐	☐	☐	☐

47* Building in unspoilt areas.

	1 Know nothing about	2 Know very little about	3 Know little about	4 Neutral	5 Know a bit about	6 Know quite a bit about	7 Know a lot about
Knowledge Level	☐	☐	☐	☐	☐	☐	☐

48* Radiation from storage of nuclear waste.

	1 Know nothing about	2 Know very little about	3 Know little about	4 Neutral	5 Know a bit about	6 Know quite a bit about	7 Know a lot about
Knowledge Level	☐	☐	☐	☐	☐	☐	☐

49* World population explosion.

	1 Know nothing about	2 Know very little about	3 Know little about	4 Neutral	5 Know a bit about	6 Know quite a bit about	7 Know a lot about
Knowledge Level	☐	☐	☐	☐	☐	☐	☐

SECTION 8: ENVIRONMENTAL CONCERN

In answering the following questions, please focus *on your daily activities and indicate the extent of your agreement or disagreement in each of the following statements.

50* Plants and animals exist primarily to be used by humans.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

51* We are approaching the limit of the number of people the earth can support.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

52* To maintain a healthy economy we will have to develop a “steady-state” economy where industrial growth is controlled.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

53* The earth is like a spaceship with only limited room and resources.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

54* Humans need not adapt to the natural environment because they can remake it to suit their needs.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

55* There are limits to growth beyond which our industrialized society cannot expand.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

56* The balance of nature is very delicate and easily upset.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

57* When humans interfere with nature it often produces disastrous consequences.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

58* Humans must live in harmony with nature in order to survive.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

59* Mankind is severely abusing the environment.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

60* Humans have the right to modify the natural environment to suit their needs.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

61* Mankind was created to rule over the rest of nature.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

SECTION 9: ENVIRONMENTAL ATTITUDE

In answering the following questions, please focus on your personal environmental awareness and knowledge and indicate the extent of your agreement or disagreement in each of the following statements.

62* The environment is one of the most important issues facing society today.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

63* We should pay a considerable amount of money to preserve our environment.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

64* Strict global measures must be taken immediately to halt environmental decline.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

65* A substantial amount of money should be devoted to environmental protection.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

66* Unless each of us recognizes the need to protect the environment, future generations will suffer the consequences.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

67* The benefits of protecting the environment do not justify the expense involved.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

68* The environmental policies of the main political parties are one issue I consider when deciding how to vote.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

69* Green issues should not be a main consideration when deciding what we do in the future.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

70* Personally, I cannot help to slow down environmental deterioration.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

71* The importance of the environment is frequently exaggerated.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

72* The benefits of overcoming environmental deterioration are not sufficient to warrant the expense involved.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

73* Even if each of us contributed towards environmental protection, the combined effect would be negligible.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

74* Too much fuss is made about environmental issues.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

75* The government should take responsibility for environmental protection.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

76* The increasing destruction of the environment is a serious problem.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

77* Everyone is personally responsible for protecting the environment in their everyday life.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

78* Issues relating to the environment are very important.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

79* If all of us, individually, made a contribution to environmental protection, it would have a significant effect.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

80* Each of us, as individuals, can make a contribution to environmental protection.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

81* Firms should always put profitability before environmental protection.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

SECTION 10: ATTITUDE TOWARDS USE

In answering the following questions, please focus on your personal environmental attitude and indicate the extent of your agreement or disagreement in each of the following statements.
Please consider as renewable energy technology all technologies that are powered by renewable energy resources.

82* Adopting renewable energy technologies is beneficial to me.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

83* Adopting renewable energy technologies is desirable to me.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

84* Adopting renewable energy technologies is favourable to me.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

85* Adopting renewable energy technologies is a good idea.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

SECTION 11: ACTUAL USE

In answering the following questions, please focus on your personal attitude and indicate the extent of your agreement or disagreement in each of the following statements.
Please consider as renewable energy technology all technologies that are powered by renewable energy resources.

86* I currently use renewable energy technologies.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

87* Assuming that renewable energy technologies will be available, I predict that I will use renewable energy technologies in the future.

	1 Strongly Disagree	2 Disagree	3 Partially Disagree	4 Neutral	5 Partially Agree	6 Agree	7 Strongly Agree
Agreement Level	☐	☐	☐	☐	☐	☐	☐

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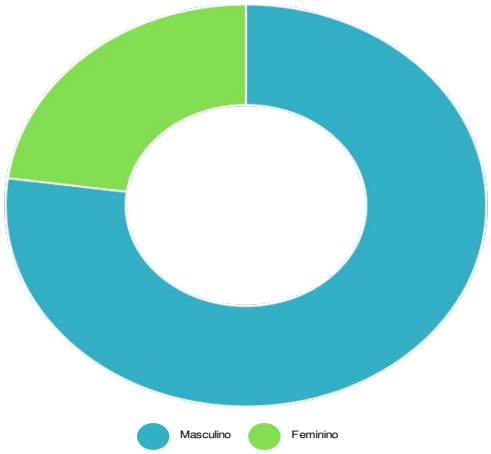
Each page much contain at least one item!

APENDIX 2: Report of results of quantitative questionnaire.
Note: The results are in Portuguese because it is the main language in Brazil, but they are on the same sequence as the questions presented on the questionnaire apendix 1.

Quick Report

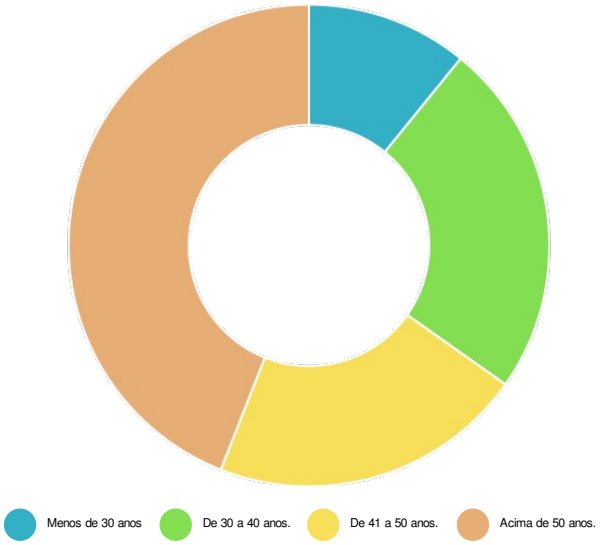
Por favor assinale seu gênero:

	Masculino	Feminino	Standard Deviation	Responses
All Data	142 (77%)	42 (23%)	50	184



Por favor assinale sua idade:

	Menos de 30 anos	De 30 a 40 anos.	De 41 a 50 anos.	Acima de 50 anos.	Standard Deviation	Responses
All Data	20 (11%)	44 (24%)	39 (21%)	**81** **(44%)**	22.1	184



Por favor informe sua nacionalidade.

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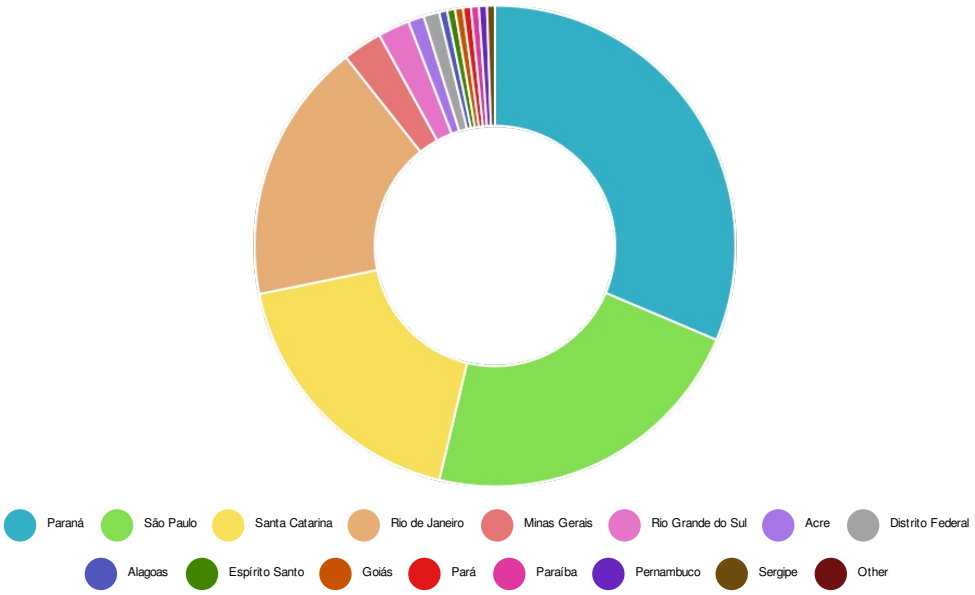
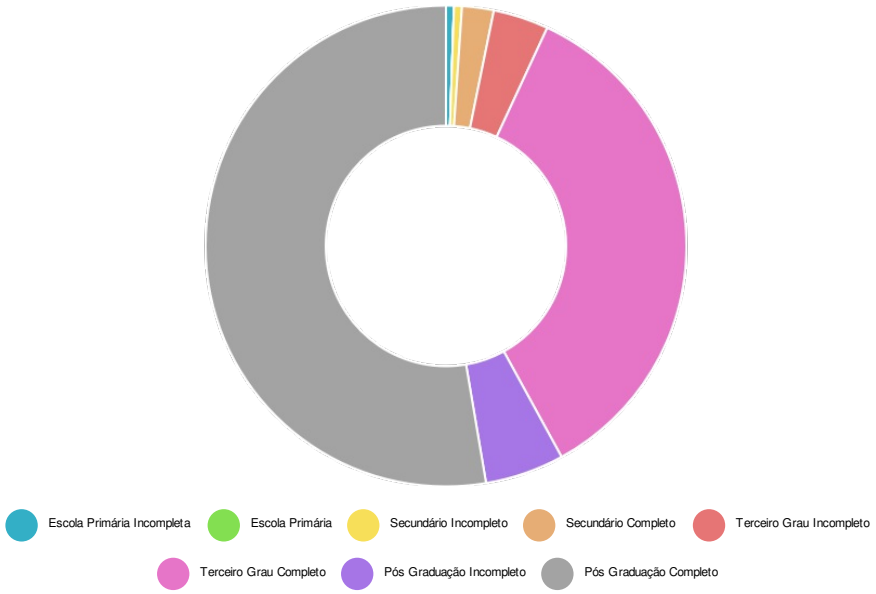
Por favor assinale o estado onde você reside atualmente:

	Paraná	São Paulo	Santa Catarina	Rio de Janeiro	Minas Gerais	Rio Grande do Sul	Acre	Distrito Federal	Alagoas	Espírito Santo	Goiás	Pará	Paraíba	Pernambuco	Sergipe	Other	Standard Deviation	Responses
All Data	**59 (31%)**	42 (22%)	34 (18%)	33 (18%)	5 (3%)	4 (2%)	2 (1%)	2 (1%)	1 (1%)	1 (1%)	1 (1%)	1 (1%)	1 (1%)	1 (1%)	1 (1%)	0 (0%)	18.26	188



Por favor assinale seu nível educacional:

	Escola Primária Incompleta	Escola Primária	Secundário Incompleto	Secundário Completo	Terceiro Grau Incompleto	Terceiro Grau Completo	Pós Graduação Incompleto	Pós Graduação Completo	Standard Deviation	Responses
All Data	1 (1%)	0 (0%)	1 (1%)	4 (2%)	7 (4%)	66 (35%)	10 (5%)	**99 (53%)**	35.19	188



Por favor indique o seu cargo:

Text Responses

estudante
Diretor
Engenheiro civil
Gerente de Negócios
IT Project Manage
Professor Universitário
estudante
hoteleira
empresario
Aposentado
Diretor
GERENTE DE LOGÍSTICA
Empresário, Consultor, Diretor
CIO
Aposentado
aposentada
Diretor
Engenheiro
Assessor de Diretoria
Socio Gerente
Auditor fiscal do trabalho
Diretora
Secretária
Gestora de Viagens
Aposentado
engenheiro eletricista
Auditor

PESQUISADORA EM SAÚDE PÚBLICA
Gerente de Vendas
Economista
Gerente
nivel superior
Engenheiro Civil
Autonoma
Aposentado
Tecnico em Engenharia de Manutenção de Proteção e Controle de Subestações
Arquiteta
ENGENHEIRO
Técnico de Engenharia de Manutenção
Supervisor
Engenheiro
Aposentada
aposentado
Marketing
diretor de uma firma de engenharia
Advogado
gerente
CIO
Advogada
Consultor
CONSULTOR JURÍDICO, AUTÔNOMO, DE EMPRESAS.
Profissional Liberal
Aposentada
Gerente de Engenharia.
diretor
empresario
Gerente
Diretora de empresa
aposentada
diretor
Diretor
desempregada
Aposentado
Diretor
VP
Administrador
Aposentado
Aposentado
Analista de Sistemas
Analista de Manutenção
Advogado
Empresário
associate mercado financeiro
administração
DIRETOR
Consultora Associada
es
pesquisador assistente
Gerente de distribuicao
PESQUISADORA EM SAÚDE PÚBLICA
Executive Assistant
Aposentada
empresario
Presidente do Conselho de Administração
Professor universitário
Professor titular
Militar reformado
Prof. universitário
Consultor
Presidente
professora universitaria
professor
professor
diretor
Engenehiro Civil
Aposentado/estudante
diretora
EMPRESARIO
Engenheiro de desenvolvimento
Designer Gráfico
economista

Board Member
Gestor
Ashoka East Africa Venture&Fellowship
Professora do Ensino Fundamental
Professor Universitario
Engenheiro Eletricista Consultor
Gerente de PCP
ENGENHEIRO MECANICO
Encarregado
Diretor
Diretor
kkkkkkkk
coordenador técnico
Engenheiro Eletricista
analista
Análista
Gerente de Marketing
Gerente de Compras de Materiais
Executiva de Negocios
Diretor Financeiro
Engenheiro Senior
Coordenador Técnico
Diretor
empresário
contador
Calculista
Diretor Executivo
gerente
Proprietário Empresa de Representação Comercial
Gerente Comercial
DIRETOR DE PLANEJAMENTO
Analista
Gerente
Gerente
engenheiro de vendas
Assistente de Diretor
Supervisor Comercial
DIRETOR
PROJETISTA SENIOR
COMPRADOR SENIOR
Gerente Comercial
ENCARREGADO FINANCEIRO
Assistente da Diretoria de Distribuição
Gerente de Vendas
Gerente Industrial
Engenheiro
Analista de Pesquisa e Desenvolvimento
ANALISTA DE PROJETOS
Assistende de Controladoria
Diretor
Engenheiro eletricista consultor
socio gerente
diretor presidente
Analista de Materiais
Engenheiro de Vendas
Consultor interno
REPRESENTANTE COMERCIAL
Coodenador de Projetos
gerente
Representante Comercial
Diretor presidente
Diretor de Area
Coordenador de Vendas
ENGENHEIRO ELETRICISTA - AUTONOMO
Gerente de Vendas e Operações
Gerente de Vendas
Diretor Comercial
Consultor processos de vendas
Gerente
Gerente Regional
Coordenador
TI
técnico segurança trabalho
Desempregado atualmente

Consultor
Projetista
Sales Excutive
Projetista
Gerente de Negócios
Area Sales Manager
Estudante
gastrônomo
gerente coml
Empresaria
Assessor de Controladoria
Programador
Autônomo
professora

Por favor assinale há quanto tempo você ocupa seu cargo atual:

	Menos de um ano	1-3 anos	3-5 anos	5-10 anos	10-20 anos	Mais de 20 anos	Standard Deviation	Responses
All Data	13 (7%)	37 (20%)	23 (13%)	29 (16%)	38 (21%)	**43 (23%)**	10.16	183

Por favor assinale seu nível de renda:

	Menos de 2 salários mínimos	De 2 a 3 salários mínimos	De 3 a 9 salários mínimos	De 9 a 12 salários mínimos	Mais de 12 salários mínimos	Standard Deviation	Responses
All Data	2 (1%)	5 (3%)	45 (24%)	24 (13%)	**112 (60%)**	40.26	188

Seria contrário aos meus princípios morais não utilizar tecnologias de energia renovável em meu ambiente.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	31 (23%)	12 (9%)	3 (2%)	6 (4%)	19 (14%)	**33 (24%)**	31 (23%)	11.7	135	4.43 / 7
										4.43 / 7

A não utilização de tecnologias de energia renovável no meio onde vivo iria contra meus princípios.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	22 (17%)	8 (6%)	4 (3%)	9 (7%)	22 (17%)	**37 (28%)**	31 (23%)	11.54	133	4.77 / 7
										4.77 / 7

Eu tenho obrigação moral em utilizar tecnologias de energia renovável em meu ambiente.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	6 (5%)	6 (5%)	8 (6%)	8 (6%)	33 (25%)	**38 (29%)**	34 (26%)	13.95	133	5.3 / 7
										5.3 / 7

Eu me sentiria culpado por não utilizar tecnologias de energia renovável em meu ambiente.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	6 (5%)	5 (4%)	19 (14%)	9 (7%)	30 (23%)	**37 (28%)**	27 (20%)	11.8	133	5.04 / 7
										5.04 / 7

Eu me sinto obrigado a utilizar tecnologias de energia renovável em meu ambiente.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	16 (12%)	15 (11%)	13 (10%)	18 (14%)	**28 (21%)**	25 (19%)	17 (13%)	5.11	132	4.29 / 7
										4.29 / 7

A utilização de tecnologias de energia renovável melhora minha imagem em meu ambiente social.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	2 (2%)	7 (5%)	2 (2%)	25 (19%)	26 (20%)	**43 (33%)**	24 (19%)	14.17	129	5.26 / 7
										5.26 / 7

As pessoas em meu ambiente social que utilizam tecnologias de energia renovável têm mais prestígio que aquelas que não utilizam.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	4 (3%)	20 (16%)	11 (9%)	31 (24%)	**35 (27%)**	19 (15%)	9 (7%)	10.61	129	4.29 / 7
										4.29 / 7

A utilização de tecnologias de energia renovável em meu ambiente social melhora o reconhecimento que as outras pessoas fazem de mim.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	5 (4%)	17 (13%)	7 (5%)	25 (19%)	**36 (28%)**	29 (22%)	10 (8%)	11	129	4.53 / 7
										4.53 / 7

Quando utilizo tecnologias de energia renovável, as pessoas em meu ambiente social me respeitam.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	5 (4%)	14 (11%)	7 (5%)	34 (26%)	**42 (33%)**	15 (12%)	12 (9%)	12.99	129	4.45 / 7
										4.45 / 7

Quando utilizo tecnologias de energia renovável meus superiores me elogiam.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	6 (5%)	12 (10%)	5 (4%)	**46 (37%)**	24 (19%)	24 (19%)	9 (7%)	13.55	126	4.41 / 7
										4.41 / 7

Eu gosto de utilizar tecnologias de energia renovável em meu ambiente.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	2 (2%)	1 (1%)	2 (2%)	7 (6%)	10 (8%)	**63 (51%)**	39 (31%)	22.2	124	5.96 / 7
										5.96 / 7

Eu gosto de ajudar outras pessoas utilizarem tecnologias de energia renovável.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	2 (2%)	2 (2%)	1 (1%)	10 (8%)	12 (10%)	**59 (48%)**	37 (30%)	20.5	123	5.87 / 7
										5.87 / 7

Eu me sinto bem em utilizar tecnologias de energia renovável em meu ambiente.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	2 (2%)	2 (2%)	0 (0%)	5 (4%)	13 (10%)	**55 (44%)**	47 (38%)	21.51	124	6.05 / 7
										6.05 / 7

A utilização de tecnologias de energia renovável em meu ambiente me dá prazer.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	2 (2%)	2 (2%)	0 (0%)	12 (10%)	15 (12%)	**55 (44%)**	38 (31%)	19.45	124	5.85 / 7
										5.85 / 7

A utilização de tecnologias de energia renovável em meu trabalho me capacita a realizar tarefas mais rapidamente.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	10 (8%)	23 (19%)	9 (7%)	**42 (35%)**	20 (17%)	13 (11%)	4 (3%)	11.76	121	3.78 / 7
										3.78 / 7

A utilização de tecnologias de energia renovável melhoraria meu desempenho no trabalho.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	12 (10%)	22 (18%)	6 (5%)	**40 (33%)**	20 (17%)	15 (13%)	5 (4%)	11.06	120	3.83 / 7
										3.83 / 7

A utilização de tecnologias de energia renovável aumentaria minha produtividade.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	11 (9%)	22 (18%)	7 (6%)	**43 (36%)**	20 (17%)	11 (9%)	6 (5%)	11.97	120	3.8 / 7
										3.8 / 7

A utilização de tecnologias de energia renovável aumentaria minha eficácia no trabalho.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	13 (11%)	23 (19%)	4 (3%)	**44 (37%)**	20 (17%)	11 (9%)	5 (4%)	12.76	120	3.73 / 7
										3.73 / 7

A utilização de tecnologias de energia renovável tornaria meu trabalho mais fácil.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	12 (10%)	23 (19%)	7 (6%)	**36 (30%)**	23 (19%)	11 (9%)	7 (6%)	9.96	119	3.81 / 7
										3.81 / 7

Eu acredito que tecnologias de energia renovável seriam muito úteis em meu trabalho.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	5 (4%)	13 (11%)	8 (7%)	**33 (28%)**	24 (20%)	23 (19%)	14 (12%)	9.19	120	4.53 / 7
										4.53 / 7

É inútil ao consumidor individual fazer qualquer coisa quanto à poluição.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	**76 (63%)**	31 (26%)	7 (6%)	1 (1%)	1 (1%)	1 (1%)	3 (3%)	26.02	120	1.63 / 7
										1.63 / 7

Quando compro algum produto, procuro levar em consideração como a minha utilização de tal produto afetará o meio ambiente e outros consumidores.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	2 (2%)	6 (5%)	4 (3%)	10 (8%)	34 (28%)	**45 (38%)**	19 (16%)	15.31	120	5.33 / 7
										5.33 / 7

Já que uma só pessoa não exerce efeito algum sobre a poluição e os problemas relativos aos recursos naturais, o que eu faço não faz diferença alguma.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	**70 (58%)**	39 (33%)	5 (4%)	0 (0%)	4 (3%)	1 (1%)	1 (1%)	25.09	120	1.63 / 7
										1.63 / 7

O comportamento de cada consumidor pode ter um efeito positivo sobre a sociedade, ao comprar produtos vendidos por companhias socialmente responsáveis.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	2 (2%)	0 (0%)	0 (0%)	2 (2%)	9 (8%)	43 (36%)	**63 (53%)**	23.56	119	6.34 / 7
										6.34 / 7

Aprender a operar tecnologias de energia renovável é algo fácil para mim.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	1 (1%)	5 (4%)	5 (4%)	24 (21%)	20 (17%)	**41 (35%)**	21 (18%)	13.06	117	5.26 / 7
										5.26 / 7

Seria fácil para mim fazer com que as tecnologias de energia renovável façam o que eu quero fazer.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	2 (2%)	6 (5%)	10 (9%)	28 (24%)	27 (23%)	**33 (28%)**	11 (9%)	11.39	117	4.84 / 7
										4.84 / 7

A minha interação com tecnologias de energia renovável é fácil de compreender.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	2 (2%)	3 (3%)	7 (6%)	18 (15%)	24 (21%)	**46 (39%)**	17 (15%)	14.2	117	5.26 / 7
										5.26 / 7

Eu penso que é fácil interagir com tecnologias de energia renovável.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	1 (1%)	3 (3%)	7 (6%)	11 (9%)	25 (22%)	**48 (41%)**	21 (18%)	15.25	116	5.45 / 7
										5.45 / 7

Seria fácil para mim desenvolver habilidade na utilização de tecnologias de energia renovável.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	1 (1%)	5 (4%)	1 (1%)	11 (9%)	23 (20%)	**57 (49%)**	19 (16%)	18.25	117	5.54 / 7
										5.54 / 7

Eu penso que é fácil utilizar tecnologias de energia renovável.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	1 (1%)	5 (4%)	6 (5%)	8 (7%)	29 (25%)	**46 (40%)**	21 (18%)	15.13	116	5.42 / 7
										5.42 / 7

Chuva ácida.

	Não sei nada a respeito	Sei muito pouco a respeito	Sei pouco a respeito	Neutro	Sei um pouco a respeito	Sei bastante a respeito	Sei muito a respeito	Standard Deviation	Responses	Weighted Average
Nível de Conhecimento	3 (3%)	10 (9%)	19 (17%)	0 (0%)	**50 (43%)**	28 (24%)	5 (4%)	16.43	115	4.63 / 7
										4.63 / 7

Poluição de Mares e Rios.

	Não sei nada a respeito	Sei muito pouco a respeito	Sei pouco a respeito	Neutro	Sei um pouco a respeito	Sei bastante a respeito	Sei muito a respeito	Standard Deviation	Responses	Weighted Average
Nível de Conhecimento	1 (1%)	1 (1%)	7 (6%)	0 (0%)	**48 (42%)**	46 (40%)	12 (10%)	19.73	115	5.43 / 7
										5.43 / 7

Poluição do Ar Causada por Estações de Energia Elétrica.

	Não sei nada a respeito	Sei muito pouco a respeito	Sei pouco a respeito	Neutro	Sei um pouco a respeito	Sei bastante a respeito	Sei muito a respeito	Standard Deviation	Responses	Weighted Average
Nível de Conhecimento	9 (8%)	10 (9%)	14 (12%)	5 (4%)	34 (30%)	**36 (32%)**	6 (5%)	12.15	114	4.55 / 7
										4.55 / 7

Aquecimento Global.

	Não sei nada a respeito	Sei muito pouco a respeito	Sei pouco a respeito	Neutro	Sei um pouco a respeito	Sei bastante a respeito	Sei muito a respeito	Standard Deviation	Responses	Weighted Average
Nível de Conhecimento	1 (1%)	2 (2%)	3 (3%)	1 (1%)	**58 (51%)**	36 (32%)	12 (11%)	20.68	113	5.38 / 7
										5.38 / 7

Destruição da Camada de Ozônio.

	Não sei nada a respeito	Sei muito pouco a respeito	Sei pouco a respeito	Neutro	Sei um pouco a respeito	Sei bastante a respeito	Sei muito a respeito	Standard Deviation	Responses	Weighted Average
Nível de Conhecimento	1 (1%)	1 (1%)	7 (6%)	2 (2%)	**61 (54%)**	31 (27%)	11 (10%)	20.71	114	5.26 / 7
										5.26 / 7

Poluição da Água Potável.

	Não sei nada a respeito	Sei muito pouco a respeito	Sei pouco a respeito	Neutro	Sei um pouco a respeito	Sei bastante a respeito	Sei muito a respeito	Standard Deviation	Responses	Weighted Average
Nível de Conhecimento	1 (1%)	0 (0%)	5 (4%)	1 (1%)	**47 (42%)**	39 (35%)	19 (17%)	18.23	112	5.55 / 7
										5.55 / 7

Poluição Causada por Pesticidas e Inseticidas.

	Não sei nada a respeito	Sei muito pouco a respeito	Sei pouco a respeito	Neutro	Sei um pouco a respeito	Sei bastante a respeito	Sei muito a respeito	Standard Deviation	Responses	Weighted Average
Nível de Conhecimento	1 (1%)	2 (2%)	10 (9%)	2 (2%)	**43 (39%)**	38 (34%)	15 (14%)	16.33	111	5.32 / 7
										5.32 / 7

Destruição das Florestas Tropicais.

	Não sei nada a respeito	Sei muito pouco a respeito	Sei pouco a respeito	Neutro	Sei um pouco a respeito	Sei bastante a respeito	Sei muito a respeito	Standard Deviation	Responses	Weighted Average
Nível de Conhecimento	1 (1%)	2 (2%)	8 (7%)	2 (2%)	**41 (36%)**	40 (35%)	19 (17%)	16.44	113	5.44 / 7
										5.44 / 7

Construções em Áreas Não Degradadas.

	Não sei nada a respeito	Sei muito pouco a respeito	Sei pouco a respeito	Neutro	Sei um pouco a respeito	Sei bastante a respeito	Sei muito a respeito	Standard Deviation	Responses	Weighted Average
Nível de Conhecimento	5 (4%)	6 (5%)	10 (9%)	5 (4%)	**49 (43%)**	27 (24%)	12 (11%)	15.13	114	4.89 / 7
										4.89 / 7

Radiação da Armazenagem de Resíduos Nucleares.

	Não sei nada a respeito	Sei muito pouco a respeito	Sei pouco a respeito	Neutro	Sei um pouco a respeito	Sei bastante a respeito	Sei muito a respeito	Standard Deviation	Responses	Weighted Average
Nível de Conhecimento	12 (11%)	15 (13%)	20 (18%)	2 (2%)	**43 (38%)**	17 (15%)	4 (4%)	12.55	113	4.03 / 7
										4.03 / 7

Explosão do Crescimento da População Mundial.

	Não sei nada a respeito	Sei muito pouco a respeito	Sei pouco a respeito	Neutro	Sei um pouco a respeito	Sei bastante a respeito	Sei muito a respeito	Standard Deviation	Responses	Weighted Average
Nível de Conhecimento	3 (3%)	4 (4%)	9 (8%)	5 (4%)	**47 (41%)**	35 (31%)	11 (10%)	16.17	114	5.09 / 7
										5.09 / 7

As plantas e os animais existem primariamente para serem utilizados pelos humanos.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	28 (25%)	**32 (28%)**	18 (16%)	5 (4%)	21 (19%)	5 (4%)	4 (4%)	10.79	113	2.91 / 7
										2.91 / 7

Estamos chegando perto do limite de pessoas que a terra pode suportar.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	11 (10%)	9 (8%)	19 (17%)	10 (9%)	**23 (20%)**	21 (18%)	21 (18%)	5.57	114	4.51 / 7
										4.51 / 7

A fim de manter uma economia saudável, teremos que desenvolver uma economia de “estado estável”, na qual o crescimento industrial seja controlado.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	6 (5%)	9 (8%)	12 (11%)	6 (5%)	28 (25%)	**30 (27%)**	22 (19%)	9.57	113	4.94 / 7
										4.94 / 7

A terra é como uma espaçonave com espaço e recursos limitados.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	6 (5%)	4 (4%)	9 (8%)	4 (4%)	17 (15%)	**38 (33%)**	36 (32%)	13.74	114	5.46 / 7
										5.46 / 7

Os seres humanos não precisam se adaptar ao ambiente natural, pois podem recriá-lo para suprir suas necessidades.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	33 (29%)	**36 (32%)**	23 (20%)	5 (4%)	13 (12%)	3 (3%)	0 (0%)	13.59	113	2.45 / 7
										2.45 / 7

Existem limites para o crescimento, para além dos quais nossa sociedade industrializada não pode se expandir.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	5 (4%)	8 (7%)	9 (8%)	11 (10%)	**31 (27%)**	28 (25%)	22 (19%)	9.74	114	4.99 / 7
										4.99 / 7

O equilíbrio da natureza é muito delicado e facilmente perturbado.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	2 (2%)	3 (3%)	7 (6%)	2 (2%)	31 (27%)	**41 (36%)**	28 (25%)	15.29	114	5.56 / 7
										5.56 / 7

Quando os seres humanos interferem com a natureza, com frequência o resultado é desastroso.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	3 (3%)	3 (3%)	11 (10%)	4 (4%)	32 (28%)	25 (22%)	**36 (32%)**	13.33	114	5.44 / 7
										5.44 / 7

Os seres humanos têm que viver em harmonia com a natureza para que possam sobreviver.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	1 (1%)	3 (3%)	1 (1%)	1 (1%)	8 (7%)	42 (38%)	**55 (50%)**	21.06	111	6.23 / 7
										6.23 / 7

A humanidade está abusando do meio ambiente severamente.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	2 (2%)	0 (0%)	3 (3%)	1 (1%)	13 (11%)	35 (31%)	**60 (53%)**	21.22	114	6.23 / 7
										6.23 / 7

Os seres humanos têm o direito de modificar o ambiente natural para adequá-lo às suas necessidades.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	18 (16%)	20 (18%)	16 (14%)	4 (4%)	**43 (38%)**	11 (10%)	2 (2%)	12.61	114	3.66 / 7
										3.66 / 7

A humanidade foi criada para governar sobre a natureza.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	**37 (33%)**	19 (17%)	16 (14%)	7 (6%)	21 (19%)	7 (6%)	5 (4%)	10.41	112	2.97 / 7
										2.97 / 7

A questão ambiental é uma das mais importantes enfrentadas pela sociedade hoje.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	2 (2%)	4 (4%)	5 (5%)	0 (0%)	23 (21%)	**38 (35%)**	38 (35%)	15.74	110	5.76 / 7
										5.76 / 7

Nós deveríamos pagar uma soma considerável de dinheiro para preservar o meio ambiente.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	8 (7%)	13 (12%)	17 (15%)	6 (5%)	**36 (32%)**	23 (21%)	8 (7%)	9.91	111	4.35 / 7
										4.35 / 7

Medidas globais estritas devem ser tomadas imediatamente para frear o declínio ambiental.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	2 (2%)	2 (2%)	2 (2%)	0 (0%)	28 (25%)	37 (33%)	**40 (36%)**	16.92	111	5.89 / 7
										5.89 / 7

Uma quantia substancial de dinheiro deveria ser dedicada à proteção ambiental.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	3 (3%)	3 (3%)	6 (5%)	2 (2%)	29 (26%)	**42 (38%)**	25 (23%)	14.93	110	5.52 / 7
										5.52 / 7

A menos que cada um de nós reconheça a necessidade de proteger o meio ambiente, as gerações futuras sofrerão as consequências.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	1 (1%)	1 (1%)	1 (1%)	1 (1%)	10 (9%)	40 (36%)	**57 (51%)**	21.36	111	6.3 / 7
										6.3 / 7

Os benefícios da proteção do meio ambiente não justificam os custos envolvidos.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	33 (30%)	**43 (39%)**	9 (8%)	3 (3%)	10 (9%)	9 (8%)	3 (3%)	14.59	110	2.57 / 7
										2.57 / 7

As políticas ambientais dos principais partidos políticos são questões que considero no momento de votar.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	4 (4%)	4 (4%)	6 (5%)	22 (20%)	**30 (27%)**	28 (25%)	17 (15%)	10.45	111	5 / 7
										5 / 7

As questões “verdes” não deveriam ser consideração principal na decisão do que fazer quanto ao futuro.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	27 (25%)	**37 (34%)**	21 (19%)	2 (2%)	15 (14%)	6 (5%)	2 (2%)	12.42	110	2.7 / 7
										2.7 / 7

Sou pessoalmente incapaz de reduzir a velocidade da deterioração ambiental.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	13 (12%)	**30 (27%)**	22 (20%)	13 (12%)	22 (20%)	9 (8%)	2 (2%)	8.71	111	3.32 / 7
										3.32 / 7

A importância do ambiente é geralmente exagerada.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	32 (29%)	**39 (35%)**	19 (17%)	4 (4%)	11 (10%)	5 (5%)	0 (0%)	13.83	110	2.44 / 7
										2.44 / 7

Os benefícios da superação da deterioração ambiental não são suficientes para justificar os custos envolvidos.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	28 (25%)	**37 (34%)**	16 (15%)	13 (12%)	11 (10%)	4 (4%)	1 (1%)	11.88	110	2.62 / 7
										2.62 / 7

Mesmo que cada um de nós contribuísse com a proteção ambiental, o efeito combinado será muito pequeno.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	36 (32%)	**41 (37%)**	13 (12%)	6 (5%)	11 (10%)	3 (3%)	1 (1%)	14.89	111	2.35 / 7
										2.35 / 7

Há muito barulho sobre as questões ambientais.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	24 (22%)	**36 (32%)**	15 (14%)	4 (4%)	20 (18%)	7 (6%)	5 (5%)	10.87	111	3.01 / 7
										3.01 / 7

O governo deveria assumir responsabilidade pela proteção ambiental.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	1 (1%)	3 (3%)	5 (5%)	3 (3%)	26 (24%)	**38 (35%)**	34 (31%)	15.08	110	5.73 / 7
										5.73 / 7

A destruição crescente do ambiente é um problema sério.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	1 (1%)	0 (0%)	0 (0%)	1 (1%)	12 (11%)	35 (32%)	**61 (55%)**	21.92	110	6.38 / 7
										6.38 / 7

Todos são pessoalmente responsáveis pela proteção do ambiente no seu dia a dia.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	1 (1%)	1 (1%)	0 (0%)	1 (1%)	9 (8%)	31 (28%)	**68 (61%)**	23.63	111	6.43 / 7
										6.43 / 7

As questões relativas ao ambiente são muito importantes.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	1 (1%)	0 (0%)	0 (0%)	2 (2%)	6 (5%)	38 (34%)	**64 (58%)**	23.36	111	6.44 / 7
										6.44 / 7

Se cada um de nós, individualmente, fizesse uma contribuição para a proteção ambiental, o resultado seria significativo.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	1 (1%)	0 (0%)	2 (2%)	1 (1%)	15 (14%)	40 (36%)	**51 (46%)**	19.65	110	6.21 / 7
										6.21 / 7

Cada um de nós, como indivíduos, pode fazer uma contribuição para a proteção ambiental.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	1 (1%)	1 (1%)	2 (2%)	1 (1%)	10 (9%)	36 (33%)	**58 (53%)**	20.94	109	6.28 / 7
										6.28 / 7

As companhias deveriam sempre colocar seus lucros antes da proteção ambiental.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	27 (25%)	**35 (32%)**	21 (19%)	8 (7%)	13 (12%)	4 (4%)	2 (2%)	11.46	110	2.68 / 7
										2.68 / 7

A adoção de tecnologias de energia renovável é algo benéfico para mim.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	1 (1%)	1 (1%)	1 (1%)	4 (4%)	13 (12%)	**50 (46%)**	39 (36%)	18.94	109	6.06 / 7
										6.06 / 7

A adoção de tecnologias de energia renovável é algo desejável a mim.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	1 (1%)	1 (1%)	0 (0%)	4 (4%)	8 (7%)	**51 (46%)**	46 (41%)	20.84	111	6.19 / 7
										6.19 / 7

A adoção de tecnologias de energia renovável é algo favorável a mim.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	1 (1%)	1 (1%)	1 (1%)	6 (6%)	14 (13%)	**43 (39%)**	43 (39%)	17.87	109	6.05 / 7
										6.05 / 7

A adoção de tecnologias de energia renovável é uma boa ideia.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	2 (2%)	0 (0%)	0 (0%)	1 (1%)	9 (8%)	37 (33%)	**62 (56%)**	22.48	111	6.37 / 7
										6.37 / 7

Eu atualmente utilizo tecnologias de energia renovável.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	4 (4%)	11 (10%)	13 (12%)	18 (17%)	**36 (33%)**	21 (19%)	5 (5%)	10.18	108	4.43 / 7
										4.43 / 7

Considerando que tecnologias de energia renovável serão disponíveis, eu imagino que utilizarei tecnologias de energia renovável no futuro.

	Discordo fortemente	Discordo	Discordo parcialmente	Neutro	Concordo parcialmente	Concordo	Concordo fortemente	Standard Deviation	Responses	Weighted Average
Nível de Concordância	1 (1%)	0 (0%)	0 (0%)	2 (2%)	6 (6%)	**52 (49%)**	45 (42%)	21.26	106	6.28 / 7
										6.28 / 7

APENDIX 3: Factor Analysis

Personal Norm

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.759
Bartlett's Test of Sphericity	Approx. Chi-Square	315.057
	df	10
	Sig.	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.033	60.652	60.652	3.033	60.652	60.652	2.429	48.588	48.588
2	1.049	20.976	81.628	1.049	20.976	81.628	1.652	33.040	81.628
3	.400	8.003	89.631						
4	.327	6.548	96.179						
5	.191	3.821	100.000						

Extraction Method: Principal Component Analysis.

Rotated Component Matrix[a]

	Component	
	1	2
Q12	.902	.243
Q13	.877	.156
Q11	.869	.227
Q9	.155	.891
Q10	.260	.850

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.818	.833	5

Image

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.825
Bartlett's Test of Sphericity	Approx. Chi-Square	412.351
	df	10
	Sig.	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.618	72.370	72.370	3.618	72.370	72.370
2	.605	12.097	84.467			
3	.379	7.585	92.052			
4	.211	4.220	96.272			
5	.186	3.728	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component
	1
Q16	.910
Q15	.886
Q17	.860
Q18	.818
Q14	.773

Extraction Method: Principal Component Analysis.
a. 1 components extracted.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.904	.904	5

Enjoyment

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.827
Bartlett's Test of Sphericity	Approx. Chi-Square	441.589
	df	6
	Sig.	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.381	84.518	84.518	3.381	84.518	84.518
2	.322	8.060	92.578			
3	.169	4.213	96.791			
4	.128	3.209	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component
	1
Q19	.940
Q21	.931
Q20	.906
Q22	.899

Extraction Method: Principal Component Analysis.
a. 1 components extracted.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.938	.939	4

Perceived Usefulness

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.928
Bartlett's Test of Sphericity	Approx. Chi-Square	1098.220
	df	15
	Sig.	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.214	86.892	86.892	5.214	86.892	86.892
2	.470	7.841	94.733			
3	.129	2.147	96.881			
4	.096	1.598	98.479			
5	.054	.899	99.378			
6	.037	.622	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component
	1
Q24	.976
Q27	.971
Q25	.967

Q26	.952
Q23	.944
Q28	.765

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.969	.968	6

Perceived Consumer Effectiveness

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.553
Bartlett's Test of Sphericity	Approx. Chi-Square	49.808
	df	6
	Sig.	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.718	42.941	42.941	1.718	42.941	42.941	1.461	36.533	36.533
2	1.082	27.048	69.989	1.082	27.048	69.989	1.338	33.456	69.989
3	.714	17.839	87.828						
4	.487	12.172	100.000						

Extraction Method: Principal Component Analysis.

Rotated Component Matrix[a]

	Component	
	1	2
Q29	.895	
Q31	.784	-.325
Q30		.840
Q32	-.212	.722

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.079	.060	4

Perceived Ease of Use

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.883
Bartlett's Test of Sphericity	Approx. Chi-Square	528.631
	df	15
	Sig.	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.454	74.232	74.232	4.454	74.232	74.232
2	.584	9.739	83.971			
3	.334	5.567	89.538			
4	.263	4.380	93.918			
5	.199	3.320	97.237			
6	.166	2.763	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component
	1
Q36	.918
Q35	.890
Q33	.865
Q37	.859
Q38	.838
Q34	.794

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.929	.930	6

Environmental Perceived Knowledge

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.887
Bartlett's Test of Sphericity	Approx. Chi-Square	928.638
	df	55
	Sig.	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.725	61.137	61.137	6.725	61.137	61.137	4.796	43.597	43.597
2	1.291	11.733	72.870	1.291	11.733	72.870	3.220	29.273	72.870
3	.934	8.491	81.361						

4	.529	4.813	86.174						
5	.352	3.198	89.371						
6	.304	2.760	92.131						
7	.287	2.611	94.742						
8	.216	1.961	96.703						
9	.163	1.479	98.182						
10	.123	1.121	99.304						
11	.077	.696	100.000						

Extraction Method: Principal Component Analysis.

Rotated Component Matrix[a]

	Component	
	1	2
Q44	.897	.209
Q42	.877	.276
Q40	.846	.176
Q43	.837	.280
Q46	.810	.408
Q45	.695	.514
Q48	.131	.887
Q41	.128	.711
Q49	.457	.700
Q47	.482	.695
Q39	.438	.544

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.923	.934	11

Environmental Concern

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.818
Bartlett's Test of Sphericity	Approx. Chi-Square	566.929
	df	66
	Sig.	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.038	41.981	41.981	5.038	41.981	41.981	3.321	27.675	27.675
2	1.635	13.624	55.605	1.635	13.624	55.605	2.462	20.513	48.188
3	1.210	10.084	65.689	1.210	10.084	65.689	2.100	17.501	65.689
4	.833	6.940	72.629						
5	.746	6.220	78.849						
6	.557	4.644	83.493						
7	.489	4.075	87.568						
8	.434	3.619	91.188						
9	.329	2.744	93.932						
10	.304	2.531	96.464						
11	.264	2.202	98.666						
12	.160	1.334	100.000						

Extraction Method: Principal Component Analysis.

Rotated Component Matrix[a]

	Component		
	1	2	3
Q59	.818	.323	-.121
Q58	.785	.233	
Q57	.752	.235	-.232
Q56	.715	.342	-.189
Q51	.523	.420	
Q55	.281	.806	
Q53	.318	.749	-.151
Q52	.317	.719	
Q61	-.243		.795
Q60	-.495		.682
Q50	.300	-.383	.672
Q54	-.104	-.249	.641

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 7 iterations.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.629	.666	12

Environmental Attitude

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.883
Bartlett's Test of Sphericity	Approx. Chi-Square	1255.322
	df	190
	Sig.	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.062	40.310	40.310	8.062	40.310	40.310	5.897	29.486	29.486
2	2.647	13.235	53.545	2.647	13.235	53.545	3.923	19.613	49.099
3	1.555	7.773	61.318	1.555	7.773	61.318	2.296	11.479	60.578
4	1.113	5.567	66.885	1.113	5.567	66.885	1.261	6.307	66.885
5	.913	4.565	71.450						
6	.822	4.109	75.559						
7	.723	3.615	79.174						
8	.683	3.416	82.590						
9	.610	3.051	85.641						
10	.507	2.537	88.178						
11	.373	1.867	90.044						
12	.356	1.778	91.822						

13	.303	1.513	93.336						
14	.279	1.397	94.733						
15	.233	1.165	95.898						
16	.228	1.141	97.039						
17	.203	1.013	98.052						
18	.150	.748	98.800						
19	.127	.633	99.433						
20	.113	.567	100.000						

Extraction Method: Principal Component Analysis.

Rotated Component Matrix[a]

	Component			
	1	2	3	4
Q77	.904	-.149		
Q78	.892	-.199		.115
Q76	.882	-.228	.127	.116
Q79	.823		.242	-.158
Q66	.812	-.269	.111	
Q80	.796		.251	-.109
Q64	.676	-.361	.299	.158
Q71	-.219	.787		
Q72		.762	-.376	
Q69	-.134	.713	-.214	
Q74	-.217	.651		.110
Q81	-.129	.626	.104	
Q73	-.263	.613	.167	.463
Q67		.528	-.375	.180
Q63	.146		.794	
Q62	.514	-.250	.626	.134
Q68	.418	-.196	.564	
Q65	.389	-.397	.541	.310
Q70		.313		.682
Q75	.511	-.258	-.186	.561

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 7 iterations.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items

.660	.739	20

Attitude Towards Use

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.823
Bartlett's Test of Sphericity	Approx. Chi-Square	472.396
	df	6
	Sig.	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.526	88.138	88.138	3.526	88.138	88.138
2	.248	6.208	94.346			
3	.155	3.871	98.217			
4	.071	1.783	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component
	1
Q83	.962
Q82	.955
Q84	.920
Q85	.918

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.954	.955	4

Actual Use

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	12.568
	df	1
	Sig.	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.341	67.063	67.063	1.341	67.063	67.063
2	.659	32.937	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component
	1
Q87	.819
Q86	.819

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.457	.509	2

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APENDIX 4: Linear Regression and Multicolinearity Test

Perceived Usefulness - Feelings, Morality, Image and Enjoyment

Correlations

Correlations

		Perceived Usefulness	Feelings	Morality	Image	Enjoyment
Pearson Correlation	Perceived Usefulness	1.000	.000	-.020	-.014	.055
	Feelings	.000	1.000	-.707	.176	-.856
	Morality	-.020	-.707	1.000	-.216	.502
	Image	-.014	.176	-.216	1.000	-.123
	Enjoyment	.055	-.856	.502	-.123	1.000
Sig. (1-tailed)	Perceived Usefulness	.	.500	.485	.489	.459
	Feelings	.500	.	.058	.369	.015
	Morality	.485	.058	.	.341	.155
	Image	.489	.369	.341	.	.408
	Enjoyment	.459	.015	.155	.408	.
N	Perceived Usefulness	6	6	6	6	6
	Feelings	6	6	6	6	6
	Morality	6	6	6	6	6
	Image	6	6	6	6	6
	Enjoyment	6	6	6	6	6

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.108[a]	.012	-3.942	.6606264	2.033

a. Predictors: (Constant), Enjoyment, Image, Morality, Feelings

b. Dependent Variable: Perceived Usefulness

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.005	4	.001	.003	1.000[b]

Residual	.436	1	.436		
Total	.442	5			

a. Dependent Variable: Perceived Usefulness

b. Predictors: (Constant), Enjoyment, Image, Morality, Feelings

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
(Constant)	-1.862	67.198		-.028	.982	-855.694	851.970					
Feelings	.166	2.251	.181	.074	.953	-28.431	28.762	.000	.073	.073	.164	6.096
1Morality	-.001	3.997	.000	.000	1.000	-50.786	50.784	-.020	.000	.000	.453	2.208
Image	-.018	.875	-.021	-.020	.987	-11.139	11.104	-.014	-.020	-.020	.952	1.051
Enjoyment	.853	8.239	.208	.103	.934	-103.837	105.542	.055	.103	.103	.246	4.069

a. Dependent Variable: Perceived Usefulness

Collinearity Diagnostics[a]

ModelDimension	Eigenvalue	Condition	Variance Proportions

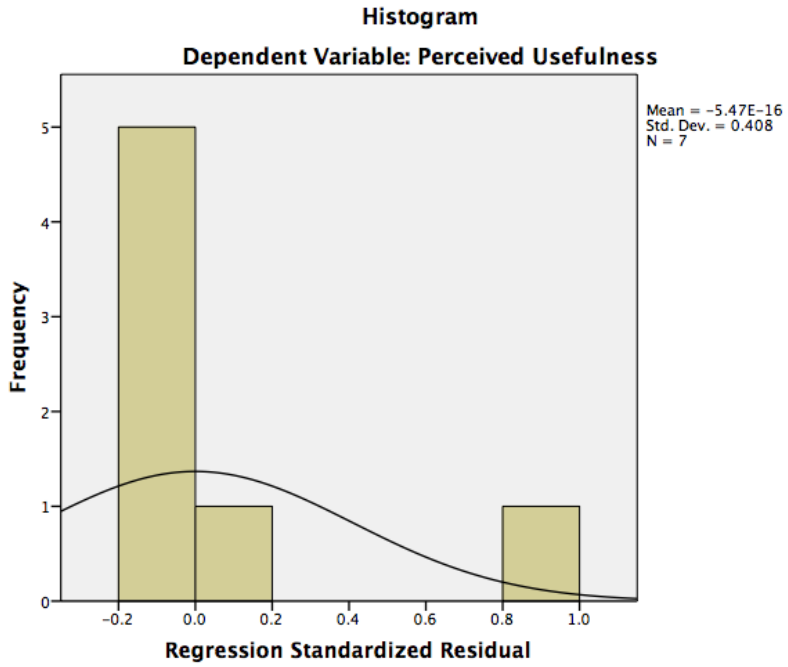
		Index	(Constant)	Feelings	Morality	Image	Enjoyment
1	1	4.992	1.000	.00	.00	.00	.00	.00
	2	.004	35.635	.00	.03	.01	.43	.00
	3	.003	38.001	.00	.10	.00	.54	.00
	4	.000	174.880	.01	.04	.73	.03	.06
	5	1.053E-005	688.523	.99	.83	.26	.00	.93

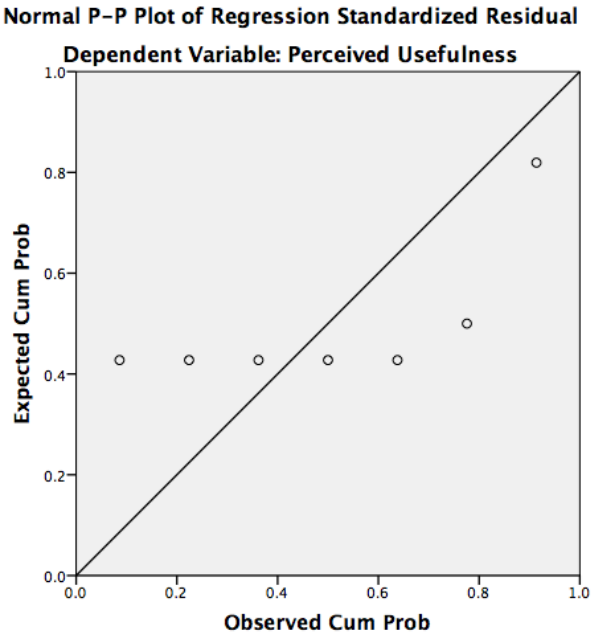
a. Dependent Variable: Perceived Usefulness

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.874813	3.968113	3.930833	.0293409	7
Std. Predicted Value	-1.743	1.160	.000	.913	7
Standard Error of Predicted Value	.270	.650	.541	.185	7
Adjusted Predicted Value	3.810220	7.465900	6.412022	1.7367687	7
Residual	-.1206133	.6030667	0E-7	.2696996	7
Std. Residual	-.183	.913	.000	.408	7
Stud. Residual	-1.000	1.000	-.571	.787	7
Deleted Residual	-3.6184001	.7236800	-2.4811886	1.9533616	7
Stud. Deleted Residual	.	.	.	.	0
Mahal. Distance	.000	4.000	2.857	1.952	7
Cook's Distance	.000	5.800	4.149	2.820	7
Centered Leverage Value	.000	.800	.571	.390	7

a. Dependent Variable: Perceived Usefulness





Environmental Balance (Dependent Variable), Pollution and Depletion of Natural Resources and Environmental Consequences.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	12.487	28.754		.434	.693	-79.021	103.994		
	Pollution and Depletion of Natural Resources	-.506	4.560	-.076	-.111	.919	-15.017	14.005	.564	1.773
	Environmental Consequences	-.891	1.237	-.495	-.720	.523	-4.828	3.046	.564	1.773

a. Dependent Variable: Environmental Balance

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.448[a]	.201	-.332	.7236113	1.760

a. Predictors: (Constant), Environmental Consequences, Pollution and Depletion of Natural Resources

b. Dependent Variable: Environmental Balance

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.395	2	.198	.377	.714[b]
	Residual	1.571	3	.524		
	Total	1.966	5			

a. Dependent Variable: Environmental Balance
b. Predictors: (Constant), Environmental Consequences, Pollution and Depletion of Natural Resources

Correlations

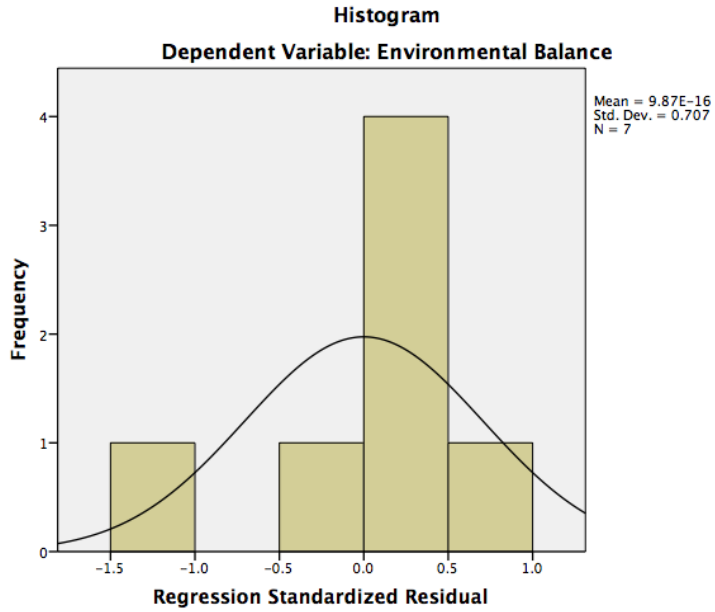
		Environmental Balance	Pollution and Depletion of Natural Resources	Environmental Consequences
Pearson Correlation	Environmental Balance	1.000	.251	-.445
	Pollution and Depletion of Natural Resources	.251	1.000	-.660
	Environmental Consequences	-.445	-.660	1.000
Sig. (1-tailed)	Environmental Balance	.	.316	.188
	Pollution and Depletion of Natural Resources	.316	.	.077
	Environmental Consequences	.188	.077	.
N	Environmental Balance	6	6	6
	Pollution and Depletion of Natural Resources	6	6	6
	Environmental Consequences	6	6	6

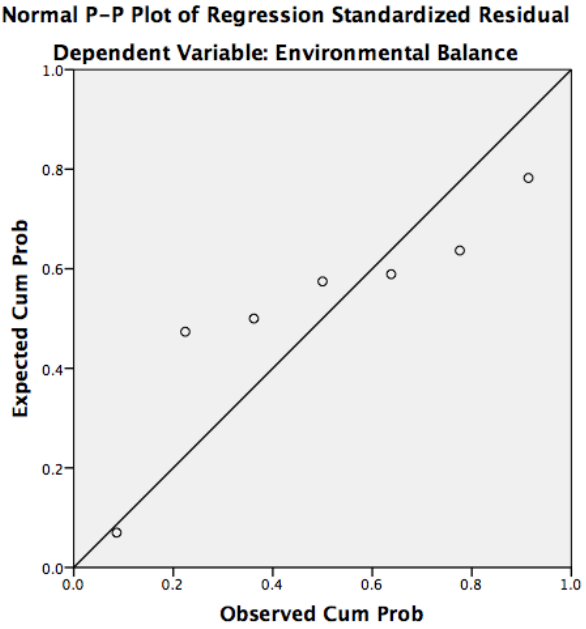
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	5.202530	6.051456	5.597680	.2566806	7
Std. Predicted Value	-1.405	1.614	.000	.913	7
Standard Error of Predicted Value	.295	.663	.463	.160	7

Adjusted Predicted Value	3.888888	5.839634	5.318701	.6568553	7
Residual	-1.0680792	.5646266	0E-7	.5116704	7
Std. Residual	-1.476	.780	.000	.707	7
Stud. Residual	-1.642	.870	.110	.862	7
Deleted Residual	-1.3217343	1.5665122	.2789789	.9097143	7
Stud. Deleted Residual	-4.212	.821	-.286	1.768	7
Mahal. Distance	.000	3.360	1.429	1.457	7
Cook's Distance	.000	1.310	.285	.475	7
Centered Leverage Value	.000	.672	.286	.291	7

a. Dependent Variable: Environmental Balance





Environmental Exploitation - Pollution and Depletion of Natural Resources, Environmental Consequences.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.424[a]	.180	-.367	.2310428	2.855

a. Predictors: (Constant), Environmental Consequences, Pollution and Depletion of Natural Resources

b. Dependent Variable: Environmental Exploitation

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.035	2	.018	.329	.742[b]
	Residual	.160	3	.053		
	Total	.195	5			

a. Dependent Variable: Environmental Exploitation

b. Predictors: (Constant), Environmental Consequences, Pollution and Depletion of Natural Resources

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	12.288	9.181		1.338	.273	-16.929	41.506		
	Pollution and Depletion of Natural Resources	-1.071	1.456	-.512	-.736	.515	-5.704	3.562	.564	1.773
	Environmental Consequences	-.294	.395	-.518	-.743	.511	-1.551	.963	.564	1.773

Correlations

		Environmental Exploitation	Pollution and Depletion of Natural Resources	Environmental Consequences
Pearson Correlation	Environmental Exploitation	1.000	-.170	-.179
	Pollution and Depletion of Natural Resources	-.170	1.000	-.660
	Environmental Consequences	-.179	-.660	1.000
Sig. (1-tailed)	Environmental Exploitation	.	.373	.367

	Pollution and Depletion of Natural Resources	.373	.	.077
	Environmental Consequences	.367	.077	.
	Environmental Exploitation	6	6	6
N	Pollution and Depletion of Natural Resources	6	6	6
	Environmental Consequences	6	6	6

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Pollution and Depletion of Natural Resources	Environmental Consequences
1	1	2.996	1.000	.00	.00	.00
	2	.004	28.556	.00	.01	.46
	3	6.050E-005	222.538	1.00	.99	.54

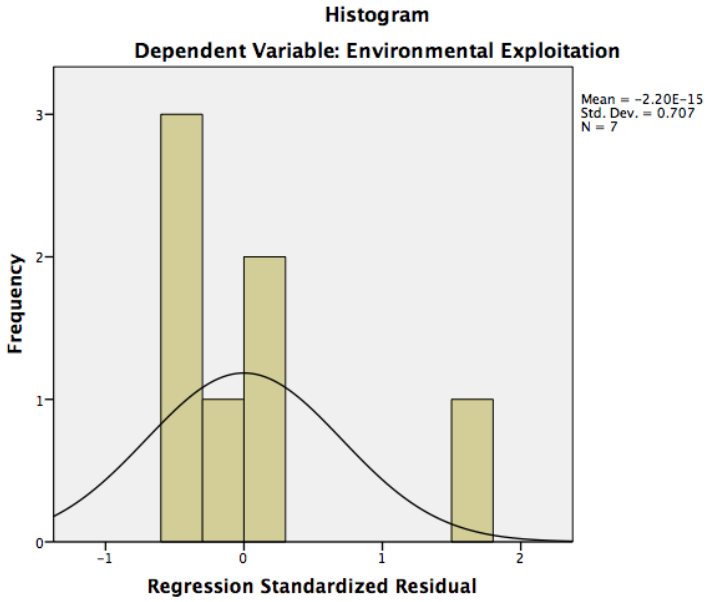
a. Dependent Variable: Environmental Exploitation

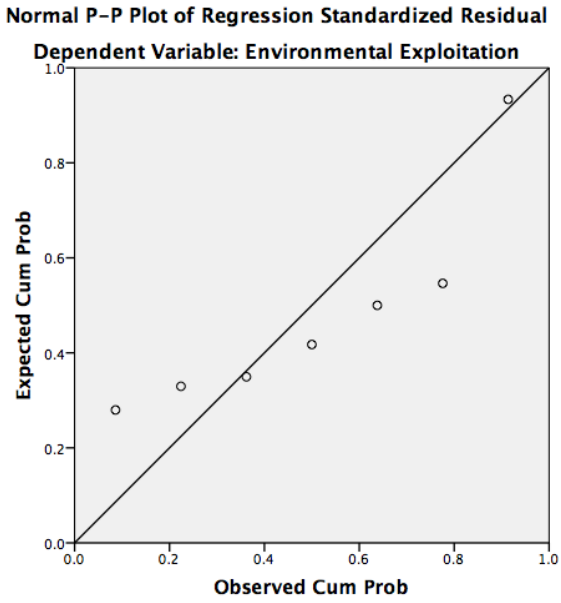
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.990210	5.238550	5.136633	.0765639	7
Std. Predicted Value	-1.746	1.215	.000	.913	7
Standard Error of Predicted Value	.094	.212	.148	.051	7
Adjusted Predicted Value	5.068393	5.742035	5.297221	.2403168	7
Residual	-.1347926	.3472391	0E-7	.1633719	7
Std. Residual	-.583	1.503	.000	.707	7
Stud. Residual	-1.352	1.658	-.207	.976	7
Deleted Residual	-.7241347	.4227068	-.1605877	.3837695	7
Stud. Deleted Residual	-1.767	4.687	.184	2.087	7
Mahal. Distance	.000	3.360	1.429	1.457	7
Cook's Distance	.000	2.665	.663	1.053	7

Centered Leverage Value	.000	.672	.286	.291	7

a. Dependent Variable: Environmental Exploitation





Environmental Control - Pollution and Depletion of Natural Resources, Environmental Consequences.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.337[a]	.114	-.477	.4739858	2.445

a. Predictors: (Constant), Environmental Consequences, Pollution and Depletion of Natural Resources

b. Dependent Variable: Environmental Control

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.086	2	.043	.193	.834[b]
	Residual	.674	3	.225		
	Total	.760	5			

a. Dependent Variable: Environmental Control

b. Predictors: (Constant), Environmental Consequences, Pollution and Depletion of Natural Resources

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-2.758	18.835		-.146	.893	-62.698	57.182		
	Pollution and Depletion of Natural Resources	1.147	2.987	.278	.384	.726	-8.358	10.652	.564	1.773
	Environmental Consequences	-.091	.810	-.081	-.112	.918	-2.670	2.488	.564	1.773

a. Dependent Variable: Environmental Control

Correlations

		Environmental Control	Pollution and Depletion of Natural Resources	Environmental Consequences
Pearson Correlation	Environmental Control	1.000	.332	-.265
	Pollution and Depletion of Natural Resources	.332	1.000	-.660
	Environmental Consequences	-.265	-.660	1.000
Sig. (1-tailed)	Environmental Control	.	.260	.306
	Pollution and Depletion of Natural Resources	.260	.	.077
	Environmental Consequences	.306	.077	.
N	Environmental Control	6	6	6
	Pollution and Depletion of Natural Resources	6	6	6
	Environmental Consequences	6	6	6

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Pollution and Depletion of Natural Resources	Environmental Consequences
1	1	2.996	1.000	.00	.00	.00
	2	.004	28.556	.00	.01	.46

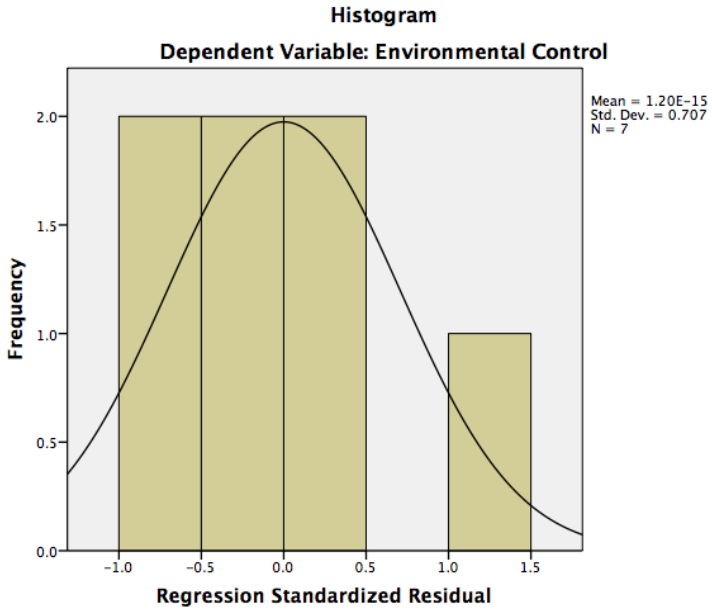
3	6.050E-005	222.538	1.00	.99	.54

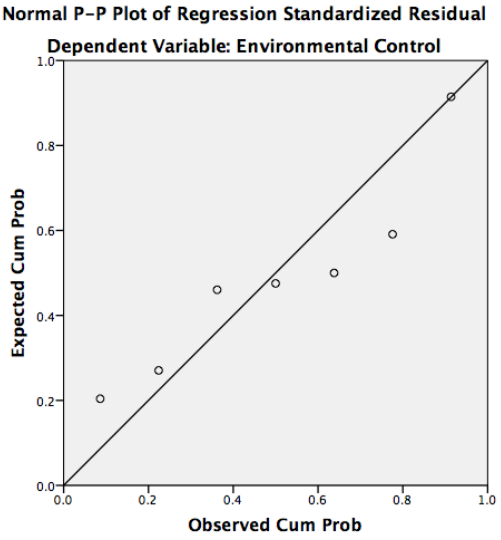
a. Dependent Variable: Environmental Control

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.860720	3.235049	3.011850	.1200668	7
Std. Predicted Value	-1.149	1.697	.000	.913	7
Standard Error of Predicted Value	.194	.434	.304	.105	7
Adjusted Predicted Value	2.781454	4.501021	3.237260	.5787811	7
Residual	-.3922196	.6490828	0E-7	.3351586	7
Std. Residual	-.827	1.369	.000	.707	7
Stud. Residual	-1.416	1.511	-.143	.963	7
Deleted Residual	-1.5555211	.7901523	-.2254096	.7459308	7
Stud. Deleted Residual	-2.007	2.523	-.094	1.407	7
Mahal. Distance	.000	3.360	1.429	1.457	7
Cook's Distance	.000	2.922	.511	1.070	7
Centered Leverage Value	.000	.672	.286	.291	7

a. Dependent Variable: Environmental Control





Personal Environmental Attitude - Environmental Balance, Environmental Exploitation and Environmental Control

Correlations

		Personal Environmental Attitude	Environmental Balance	Environmental Exploitation	Environmental Control
Pearson Correlation	Personal Environmental Attitude	1.000	.282	.056	.318
	Environmental Balance	.282	1.000	.297	.335
	Environmental Exploitation	.056	.297	1.000	.682
	Environmental Control	.318	.335	.682	1.000
Sig. (1-tailed)	Personal Environmental Attitude	.	.270	.453	.244
	Environmental Balance	.270	.	.259	.231
	Environmental Exploitation	.453	.259	.	.046
	Environmental Control	.244	.231	.046	.

N	Personal Environmental Attitude	7	7	7	7
	Environmental Balance	7	7	7	7
	Environmental Exploitation	7	7	7	7
	Environmental Control	7	7	7	7

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.440[a]	.194	-.613	.2550523	.980

a. Predictors: (Constant), Environmental Control, Environmental Balance, Environmental Exploitation

b. Dependent Variable: Personal Environmental Attitude

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.047	3	.016	.240	.864[b]
	Residual	.195	3	.065		
	Total	.242	6			

a. Dependent Variable: Personal Environmental Attitude

b. Predictors: (Constant), Environmental Control, Environmental Balance, Environmental Exploitation

Coefficients[a]

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	Collinearity Statistics

		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	6.938	3.381		2.052	.133	-3.823	17.699		
	Environmental Balance	.078	.194	.224	.405	.713	-.539	.696	.879	1.138
	Environmental Exploitation	-.368	.793	-.330	-.463	.675	-2.892	2.157	.529	1.889
	Environmental Control	.264	.407	.468	.648	.563	-1.032	1.561	.515	1.940

a. Dependent Variable: Personal Environmental Attitude

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	Environmental Balance	Environmental Exploitation	Environmental Control
1	1	3.987	1.000	.00	.00	.00	.00
	2	.007	23.471	.01	.25	.00	.58
	3	.005	27.164	.04	.75	.02	.05
	4	.000	109.137	.95	.00	.98	.37

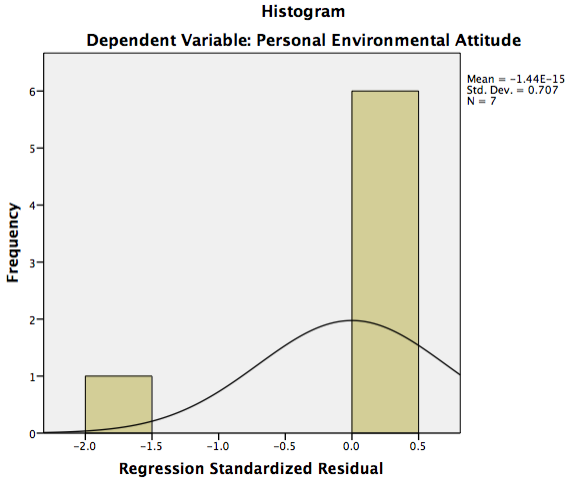
a. Dependent Variable: Personal Environmental Attitude

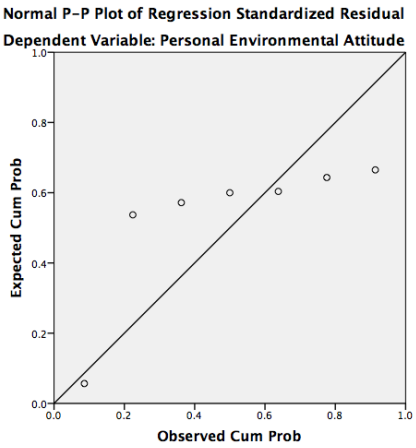
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	6.139124	6.382388	6.284671	.0883570	7
Std. Predicted Value	-1.647	1.106	.000	1.000	7
Standard Error of Predicted Value	.096	.243	.184	.064	7
Adjusted Predicted Value	5.617543	6.352000	6.035901	.3205828	7
Residual	-.4039714	.1087048	0E-7	.1803492	7

Std. Residual	-1.584	.426	.000	.707	7
Stud. Residual	-1.711	.880	.255	.916	7
Deleted Residual	-.4713000	.7514105	.2487704	.4130386	7
Stud. Deleted Residual	-8.941	.835	-.822	3.591	7
Mahal. Distance	.000	4.607	2.571	1.972	7
Cook's Distance	.000	1.976	.604	.758	7
Centered Leverage Value	.000	.768	.429	.329	7

a. Dependent Variable: Personal Environmental Attitude





Understated Environmental Attitude - Environmental Balance, Environmental Exploitation and Environmental Control

Correlations

		Understated Environmental Attitude	Environmental Balance	Environmental Exploitation	Environmental Control
Pearson Correlation	Understated Environmental Attitude	1.000	-.320	-.028	-.471
	Environmental Balance	-.320	1.000	.297	.335
	Environmental Exploitation	-.028	.297	1.000	.682
	Environmental Control	-.471	.335	.682	1.000
Sig. (1-tailed)	Understated Environmental Attitude	.	.242	.476	.143
	Environmental Balance	.242	.	.259	.231
	Environmental Exploitation	.476	.259	.	.046
	Environmental Control	.143	.231	.046	.
N	Understated Environmental Attitude	7	7	7	7
	Environmental Balance	7	7	7	7
	Environmental Exploitation	7	7	7	7
	Environmental Control	7	7	7	7

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.654[a]	.428	-.145	.2255866	1.200

a. Predictors: (Constant), Environmental Control, Environmental Balance, Environmental Exploitation
b. Dependent Variable: Understated Environmental Attitude

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.114	3	.038	.747	.592[b]
	Residual	.153	3	.051		
	Total	.267	6			

a. Dependent Variable: Understated Environmental Attitude
b. Predictors: (Constant), Environmental Control, Environmental Balance, Environmental Exploitation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.032	2.991		.345	.753		
	Environmental Balance	-.084	.172	-.228	-.489	.659	.879	1.138
	Environmental Exploitation	.675	.702	.578	.962	.407	.529	1.889
	Environmental Control	-.467	.360	-.788	-1.296	.286	.515	1.940

a. Dependent Variable: Understated Environmental Attitude

Collinearity Diagnostics[a]

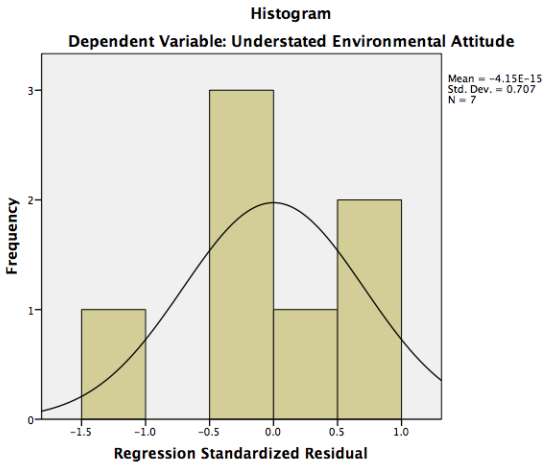
Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	Environmental Balance	Environmental Exploitation	Environmental Control
1	1	3.987	1.000	.00	.00	.00	.00
	2	.007	23.471	.01	.25	.00	.58
	3	.005	27.164	.04	.75	.02	.05
	4	.000	109.137	.95	.00	.98	.37

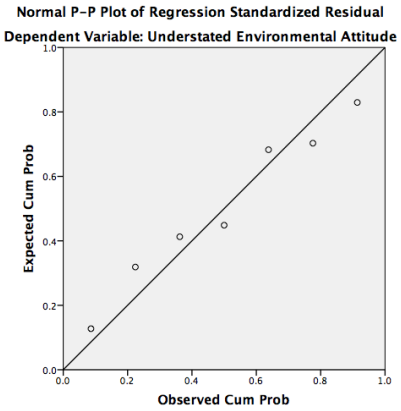
a. Dependent Variable: Understated Environmental Attitude

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.494701	2.879782	2.623871	.1378994	7
Std. Predicted Value	-.937	1.856	.000	1.000	7
Standard Error of Predicted Value	.085	.215	.162	.056	7
Adjusted Predicted Value	1.401663	2.845268	2.328121	.5192168	7
Residual	-.2568714	.2147341	0E-7	.1595138	7
Std. Residual	-1.139	.952	.000	.707	7
Stud. Residual	-1.230	1.606	.318	1.204	7
Deleted Residual	-.2996833	1.2002366	.2957506	.6391075	7
Stud. Deleted Residual	-1.426	3.495	.941	2.020	7
Mahal. Distance	.000	4.607	2.571	1.972	7
Cook's Distance	.002	6.445	1.814	2.775	7
Centered Leverage Value	.000	.768	.429	.329	7

a. Dependent Variable: Understated Environmental Attitude





Legal/Financial Environmental Attitude - Environmental Balance, Environmental Exploitation and Environmental Control

Correlations

		Legal/Financial Environmental Attitude	Environmental Balance	Environmental Exploitation	Environmental Control
Pearson Correlation	Legal/Financial Environmental Attitude	1.000	-.066	.728	.313
	Environmental Balance	-.066	1.000	.297	.335
	Environmental Exploitation	.728	.297	1.000	.682
	Environmental Control	.313	.335	.682	1.000
Sig. (1-tailed)	Legal/Financial Environmental Attitude	.	.458	.082	.304
	Environmental Balance	.458	.	.314	.291
	Environmental Exploitation	.082	.314	.	.102
	Environmental Control	.304	.291	.102	.

N	Legal/Financial Environmental Attitude	5	5	5	5
	Environmental Balance	5	5	5	5
	Environmental Exploitation	5	5	5	5
	Environmental Control	5	5	5	5

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.810[a]	.656	-.374	.6355544	1.477

a. Predictors: (Constant), Environmental Control, Environmental Balance, Environmental Exploitation

b. Dependent Variable: Legal/Financial Environmental Attitude

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.772	3	.257	.637	.701[b]
	Residual	.404	1	.404		
	Total	1.176	4			

a. Dependent Variable: Legal/Financial Environmental Attitude

b. Predictors: (Constant), Environmental Control, Environmental Balance, Environmental Exploitation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-5.188	8.427		-.616	.649		

	Environmental Balance	-.208	.483	-.269	-.431	.741	.879	1.138
	Environmental Exploitation	2.446	1.977	.997	1.237	.433	.529	1.889
	Environmental Control	-.344	1.015	-.277	-.339	.792	.515	1.940

a. Dependent Variable: Legal/Financial Environmental Attitude

Collinearity Diagnostics[a]

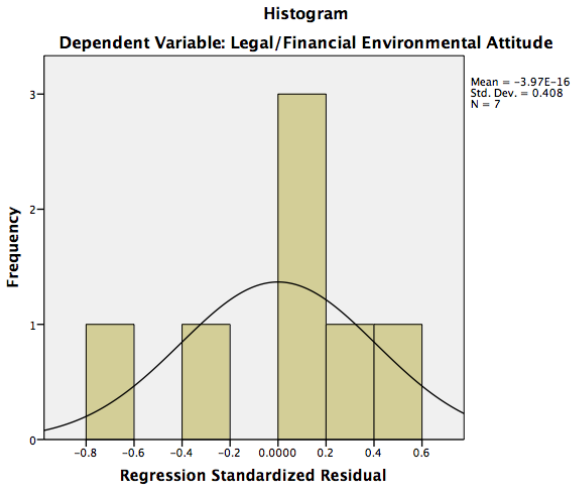
Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	Environmental Balance	Environmental Exploitation	Environmental Control
1	1	3.982	1.000	.00	.00	.00	.00
	2	.010	19.866	.01	.25	.00	.58
	3	.008	22.974	.04	.75	.02	.05
	4	.000	92.197	.95	.00	.98	.37

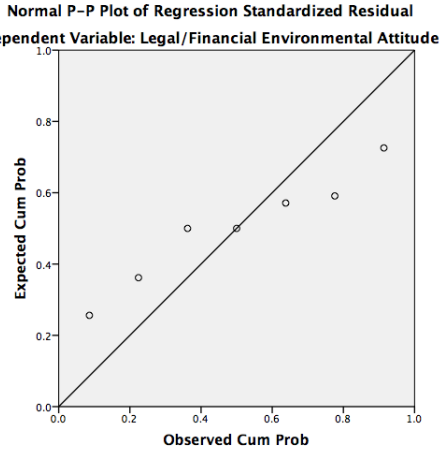
a. Dependent Variable: Legal/Financial Environmental Attitude

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.646259	5.673003	5.170400	.3586685	7
Std. Predicted Value	-1.193	1.144	.000	.816	7
Standard Error of Predicted Value	.284	.625	.485	.148	7
Adjusted Predicted Value	2.243671	6.965636	4.513544	1.6381169	7
Residual	-.4165881	.3812405	0E-7	.2594640	7
Std. Residual	-.655	.600	.000	.408	7
Stud. Residual	-1.000	1.000	.143	.900	7
Deleted Residual	-1.7952355	3.5433290	.6568560	1.9338279	7
Stud. Deleted Residual	.	.	.	.	0
Mahal. Distance	.000	3.071	1.714	1.314	7
Cook's Distance	.000	7.521	2.072	2.880	7
Centered Leverage Value	.000	.768	.429	.329	7

a. Dependent Variable: Legal/Financial Environmental Attitude





Political Environmental Attitude - Environmental Balance, Environmental Exploitation and Environmental Control

Correlations

		Political Environmental Attitude	Environmental Balance	Environmental Exploitation	Environmental Control
Pearson Correlation	Political Environmental Attitude	1.000	.008	.757	.602
	Environmental Balance	.008	1.000	.297	.335
	Environmental Exploitation	.757	.297	1.000	.682

Sig. (1-tailed)	Environmental Control	.602	.335	.682	1.000
	Political Environmental Attitude	.	.495	.069	.142
	Environmental Balance	.495	.	.314	.291
	Environmental Exploitation	.069	.314	.	.102
	Environmental Control	.142	.291	.102	.
N	Political Environmental Attitude	5	5	5	5
	Environmental Balance	5	5	5	5
	Environmental Exploitation	5	5	5	5
	Environmental Control	5	5	5	5

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.807[a]	.652	-.394	1.0137444	1.477

a. Predictors: (Constant), Environmental Control, Environmental Balance, Environmental Exploitation

b. Dependent Variable: Political Environmental Attitude

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.921	3	.640	.623	.705[b]
	Residual	1.028	1	1.028		
	Total	2.949	4			

a. Dependent Variable: Political Environmental Attitude

b. Predictors: (Constant), Environmental Control, Environmental Balance, Environmental Exploitation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-8.624	13.442		-.642	.637		
	Environmental Balance	-.332	.771	-.271	-.431	.741	.879	1.138
	Environmental Exploitation	2.656	3.153	.683	.842	.554	.529	1.889
	Environmental Control	.446	1.619	.226	.275	.829	.515	1.940

a. Dependent Variable: Political Environmental Attitude

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	Environmental Balance	Environmental Exploitation	Environmental Control
1	1	3.982	1.000	.00	.00	.00	.00
	2	.010	19.866	.01	.25	.00	.58
	3	.008	22.974	.04	.75	.02	.05
	4	.000	92.197	.95	.00	.98	.37

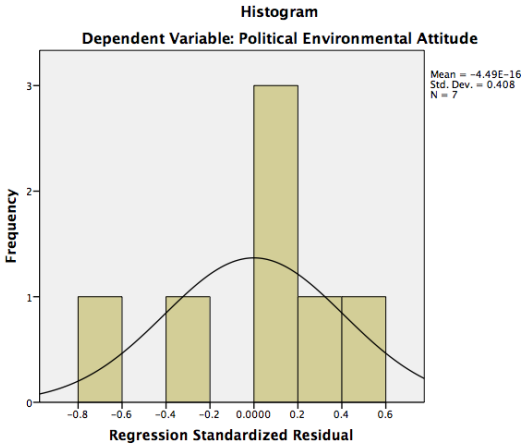
a. Dependent Variable: Political Environmental Attitude

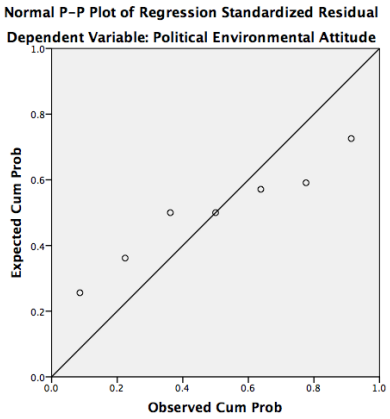
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.890600	5.531168	4.498700	.5658874	7
Std. Predicted Value	-.877	1.490	.000	.816	7
Standard Error of Predicted Value	.453	.997	.774	.235	7
Adjusted Predicted Value	.061194	7.362200	3.450978	2.6631495	7

Residual	-.6644812	.6080996	0E-7	.4138594	7
Std. Residual	-.655	.600	.000	.408	7
Stud. Residual	-1.000	1.000	.143	.900	7
Deleted Residual	-2.8635001	5.6518059	1.0477217	3.0845626	7
Stud. Deleted Residual	.	.	.	.	0
Mahal. Distance	.000	3.071	1.714	1.314	7
Cook's Distance	.000	7.521	2.072	2.880	7
Centered Leverage Value	.000	.768	.429	.329	7

a. Dependent Variable: Political Environmental Attitude





Attitude Towards Use - Perceived Usefulness

Correlations[a]

	Attitude Towards Use	Perceived Usefulness

Std. Cross-product	Attitude Towards Use	1.000	.997
	Perceived Usefulness	.997	1.000
Sig. (1-tailed)	Attitude Towards Use	.	.000
	Perceived Usefulness	.000	.
N	Attitude Towards Use	6	6
	Perceived Usefulness	6	6

a. Coefficients have been calculated through the origin.

Model Summary[c,d]

Model	R	R Square[b]	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.997[a]	.995	.994	.4878110	1.087

a. Predictors: Perceived Usefulness

b. For regression through the origin (the no-intercept model), R Square measures the proportion of the variability in the dependent variable about the origin explained by regression. This CANNOT be compared to R Square for models which include an intercept.

c. Dependent Variable: Attitude Towards Use

d. Linear Regression through the Origin

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	226.968	1	226.968	953.810	.000[c]
	Residual	1.190	5	.238		
	Total	228.158[d]	6			

a. Dependent Variable: Attitude Towards Use

b. Linear Regression through the Origin

c. Predictors: Perceived Usefulness

d. This total sum of squares is not corrected for the constant because the constant is zero for regression through the origin.

Coefficients[a,b]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF

1	Perceived Usefulness	1.561	.051	.997	30.884	.000	1.000	1.000

a. Dependent Variable: Attitude Towards Use

b. Linear Regression through the Origin

Collinearity Diagnostics[a,b]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions
				Perceived Usefulness
1	1	1.000	1.000	1.00

a. Dependent Variable: Attitude Towards Use

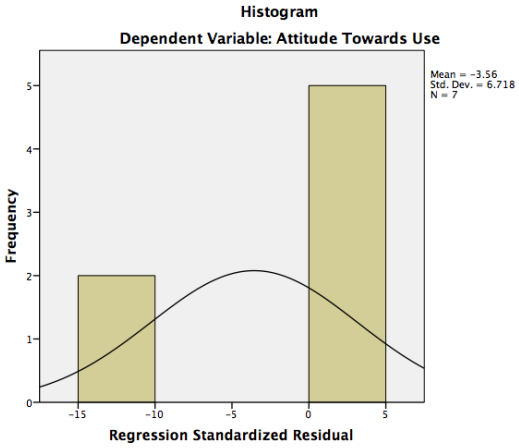
b. Linear Regression through the Origin

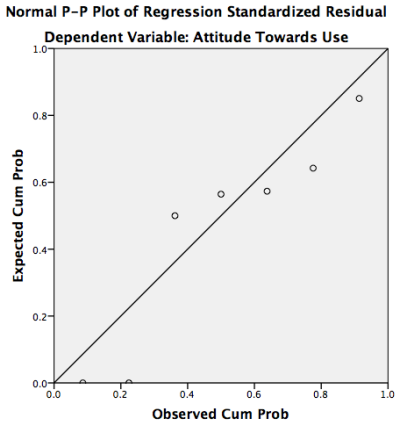
Residuals Statistics[a,b]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	.000000	7.077216	5.259305	2.3574816	7
Std. Predicted Value	-13.227	2.029	-1.890	5.082	7
Standard Error of Predicted Value	.000	.229	.170	.076	7
Adjusted Predicted Value	.000000	9.081251	5.678609	2.7646630	7
Residual	-7.0772161	.5068607	-1.7360623	3.2773272	7
Std. Residual	-14.508	1.039	-3.559	6.718	7
Stud. Residual	-16.434	1.128	-3.965	7.487	7
Deleted Residual	-9.0812511	.5972230	-2.1553665	4.0740904	7
Stud. Deleted Residual	.000	1.168	.374	.462	5
Mahal. Distance	.000	1.324	.857	.405	7
Cook's Distance	.000	76.480	15.541	29.396	7
Centered Leverage Value	.000	.221	.143	.068	7

a. Dependent Variable: Attitude Towards Use

b. Linear Regression through the Origin





Attitude Towards Use - Perceived Ease of Use

Correlations[a]

		Attitude Towards Use	Perceived Ease of Use
Std. Cross-product	Attitude Towards Use	1.000	.999
	Perceived Ease of Use	.999	1.000
Sig. (1-tailed)	Attitude Towards Use	.	.000
	Perceived Ease of Use	.000	.
N	Attitude Towards Use	6	6

	Perceived Ease of Use	6	6

a. Coefficients have been calculated through the origin.

Model Summary[c,d]

Model	R	R Square[b]	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.999[a]	.999	.998	.2571313	.992

a. Predictors: Perceived Ease of Use

b. For regression through the origin (the no-intercept model), R Square measures the proportion of the variability in the dependent variable about the origin explained by regression. This CANNOT be compared to R Square for models which include an intercept.

c. Dependent Variable: Attitude Towards Use

d. Linear Regression through the Origin

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	227.828	1	227.828	3445.851	.000[c]
	Residual	.331	5	.066		
	Total	228.158[d]	6			

a. Dependent Variable: Attitude Towards Use

b. Linear Regression through the Origin

c. Predictors: Perceived Ease of Use

d. This total sum of squares is not corrected for the constant because the constant is zero for regression through the origin.

Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	Perceived Ease of Use	1.161	.020	.999	58.701	.000	1.000	1.000

a. Dependent Variable: Attitude Towards Use
b. Linear Regression through the Origin

Collinearity Diagnostics[a,b]

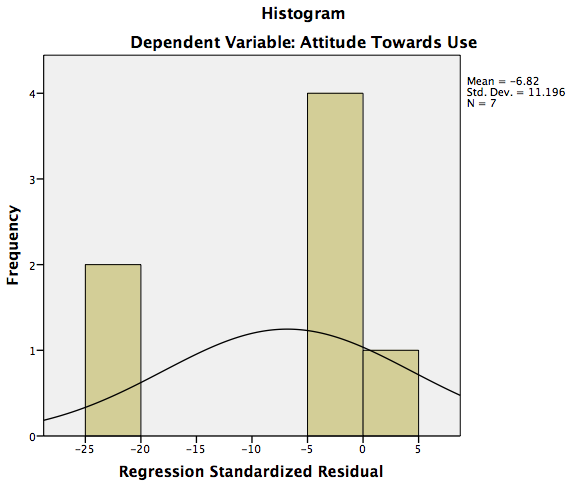
Model	Dimension	Eigenvalue	Condition Index	Variance Proportions
				Perceived Ease of Use
1	1	1.000	1.000	1.00

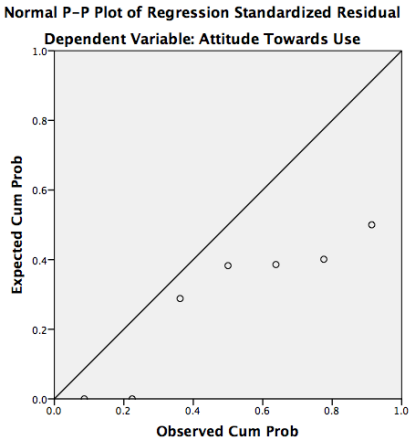
a. Dependent Variable: Attitude Towards Use
b. Linear Regression through the Origin

Residuals Statistics[a,b]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	.000000	6.443707	5.277141	2.3412984	7
Std. Predicted Value	-21.754	1.014	-3.108	8.273	7
Standard Error of Predicted Value	.000	.110	.090	.040	7
Adjusted Predicted Value	.000000	7.598368	5.606331	2.5215827	7
Residual	-6.2821436	0E-7	-1.7538979	2.8789585	7
Std. Residual	-24.432	.000	-6.821	11.196	7
Stud. Residual	-26.869	.000	-7.433	12.207	7
Deleted Residual	-7.5983677	0E-7	-2.0830878	3.4229527	7
Stud. Deleted Residual	-.572	.000	-.281	.203	5
Mahal. Distance	.000	1.093	.857	.387	7
Cook's Distance	.000	151.266	34.548	61.514	7
Centered Leverage Value	.000	.182	.143	.064	7

a. Dependent Variable: Attitude Towards Use
b. Linear Regression through the Origin





Attitude Towards Use - Environmental Attitude

Correlations[a]

		Attitude Towards Use	Personal Environmental Attitude	Understated Environmental Attitude	Legal/Financial Environmental Attitude	Political Environmental Attitude
Std. Cross-product	Attitude Towards Use	1.000	.999	.998	.997	.989
	Personal Environmental Attitude	.999	1.000	.996	.996	.989
	Understated Environmental Attitude	.998	.996	1.000	.997	.990

Sig. (1-tailed)	Legal/Financial Environmental Attitude	.997	.996	.997	1.000	.997
	Political Environmental Attitude	.989	.989	.990	.997	1.000
	Attitude Towards Use	.	.000	.000	.000	.000
	Personal Environmental Attitude	.000	.	.000	.000	.000
	Understated Environmental Attitude	.000	.000	.	.000	.000
	Legal/Financial Environmental Attitude	.000	.000	.000	.	.000
	Political Environmental Attitude	.000	.000	.000	.000	.
N	Attitude Towards Use	7	7	7	7	7
	Personal Environmental Attitude	7	7	7	7	7
	Understated Environmental Attitude	7	7	7	7	7
	Legal/Financial Environmental Attitude	7	7	7	7	7
	Political Environmental Attitude	7	7	7	7	7

a. Coefficients have been calculated through the origin.

Model Summary[c,d]

Model	R	R Square[b]	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	1.000[a]	1.000	.999	.1512464	.208

a. Predictors: Political Environmental Attitude, Personal Environmental Attitude, Understated Environmental Attitude, Legal/Financial Environmental Attitude
b. For regression through the origin (the no-intercept model), R Square measures the proportion of the variability in the dependent variable about the origin explained by regression. This CANNOT be compared to R Square for models which include an intercept.
c. Dependent Variable: Attitude Towards Use
d. Linear Regression through the Origin

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	266.105	4	66.526	2908.194	.000[c]
	Residual	.069	3	.023		
	Total	266.174[d]	7			

a. Dependent Variable: Attitude Towards Use
b. Linear Regression through the Origin
c. Predictors: Political Environmental Attitude, Personal Environmental Attitude, Understated Environmental Attitude, Legal/Financial Environmental Attitude
d. This total sum of squares is not corrected for the constant because the constant is zero for regression through the origin.

Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	Personal Environmental Attitude	.556	.129	.566	4.322	.023	.005	199.914
	Understated Environmental Attitude	-.134	.420	-.057	-.318	.771	.003	374.272

Legal/Financial Environmental Attitude	1.227	.470	1.032	2.613	.079	.001	1816.292
Political Environmental Attitude	-.738	.277	-.544	-2.669	.076	.002	484.055

a. Dependent Variable: Attitude Towards Use

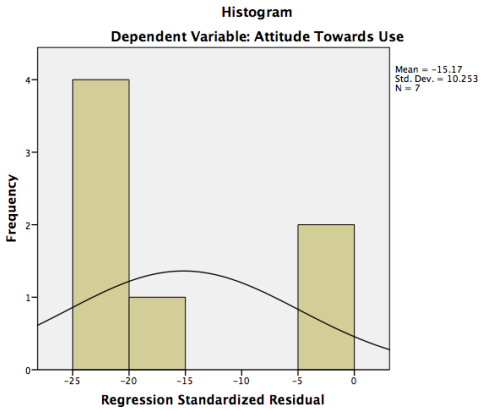
b. Linear Regression through the Origin

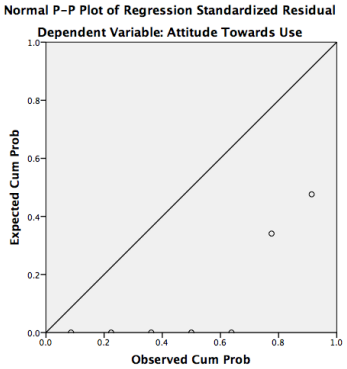
Residuals Statistics[a,b]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.922583	9.806395	5.817128	2.9193963	7
Std. Predicted Value	-19.117	21.487	-2.044	17.220	7
Standard Error of Predicted Value	.128	1.339	.938	.554	7
Adjusted Predicted Value	6.226996	6.278206	6.252601	.0362105	2
Residual	-3.4393945	-.0090993	-2.2938851	1.5507770	7
Std. Residual	-22.740	-.060	-15.167	10.253	7
Stud. Residual	-.776	-.132	-.454	.456	2
Deleted Residual	-.2221060	-.0434966	-.1328013	.1262959	2
Stud. Deleted Residual	-.709	-.108	-.408	.425	2
Mahal. Distance	5.044	548.896	349.845	239.534	7
Cook's Distance	.016	.389	.202	.263	2
Centered Leverage Value	.721	78.414	49.978	34.219	7

a. Dependent Variable: Attitude Towards Use

b. Linear Regression through the Origin


Histogram
Dependent Variable: Attitude Towards Use
Mean = -15.17
Std. Dev. = 10.253
N = 7
Frequency
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Attitude Towards Use
Expected Cum Prob
Observed Cum Prob